

AMERICAN VETERINARY REVIEW.

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EDITORIAL.

EUROPEAN CHRONICLES.

PARIS, July 15, 1910.

UPON EXPERIMENTAL CANCER.—Communications on this subject and records of experiments by many investigators have on various occasions found their way in scientific medical and veterinary papers and many facts have already been established in relation to the grafting of cancers on various species. Numerous and important as the reports have been, positive conclusions have not been accepted in all cases and on that account the question remains open, leaving at the same time immense interest for all new facts that may be recorded, as they have been, and will again be, all over the world. At a recent medical meeting held at Geneva, a very interesting communication was presented and discussed by a physician, Dr. Odier, in which he resumed pretty well and in a general way all that has been done on that question. Indeed Dr. Odier exhibited at the meeting four mice affected with experimental cancer, a sarcoma originating from one that Prof. Ehrlich had sent him from Frankfort. The tumor developed in the first animal was 45 days old, and was in size three-quarters as big as the whole body of the little animal. In the other three mice, inoculated 19 days before, the tumor varied in size between that of a small pea to that of a large hazel nut. What facts have so far been obtained by those experiments on mice and on rats? In the cancer obtained experimentally in these animals, grafting was resorted to. Primitive experiments, which go back to 1773,

and have been renewed to our days, were begun by inoculation of human cancer to animals and particularly to mice. Old writers claim to have obtained positive inoculations, while modern experimenters deny that graftings in such conditions could be obtained. It is probable, however, that some successful inoculations may have been obtained, as Dr. Odier has a mouse which has been successfully inoculated with human carcinoma. All the animals that Dr. Odier has experimented with received concentrated solution of glycogene.

The conditions of transplantation are to-day perfectly defined. It is thus that it is known that a tumor left exposed at a temperature of 37° C. for twenty-four hours cannot be used after that length of time. On the contrary if it is exposed several minutes only, its virulence is increased. Phenol and cyanide of potassium stop its development. Temperature very close to zero conserves to the cancerous cell the faculty of reproduction. Ehrlich has obtained a positive graft with a tumor kept for a year in the ice box.

Once the cancerous cell created, it reproduces itself without limit. With one sprout of spontaneous adeno-carcinoma, Jensen has succeeded in reproducing 200,000 cancers. The notion of perennity of the cancerous cell takes us away from the facts known to this day in pathology.

Notwithstanding all the objections and criticisms which are advanced against experimental cancer, it is nevertheless certain, that it has allowed science to acquire facts of capital importance.

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Among these the culminating one is the anticancerous immunity of mice and rats. It is possible to obtain this immunity in various manners. 1. By previous inoculations of crushed tumors. 2. By the injection of the red corpuscles of mice. 3. By that of liver or spleen from mice. 4. By the resorption of a tumor partially developed.

To those facts must be added the opinion sustained by Ehrlich, that pregnant mice are peculiarly refractory. Dr. Odier

differs from this opinion. For him gestation promotes the growth of a transplanted tumor in some conditions. One of the mice presented at the meeting was indeed in gestation.

Immunity acquired towards a tumor of special anatomical form has nothing specific by itself. That obtained by inoculation of crushed tumor or by resorption of a grafted tumor is a panimmunity. Sarcoma immunizes against carcinoma, adenocarcinoma, osteosarcoma and chondroma.

The most interesting point in connection with the experiments upon immunity in animals is that which relates to rats. When one is inoculated with a tumor coming from a mouse, it develops in eight or ten days, exactly as in the mouse. But from that time the rat's organism defends itself and the tumor disappears in the same length of time, say eight or ten days. From that time the rat remains absolutely refractory to any other inoculation. This phenomena is called by Ehrlich athrepsical immunity. He explains it by saying that there exists in mice a substance "X," that Odier calls cancerogene, which is absent or at least is in very small quantity in rats. This substance, X, indispensable to the growth of the cancer, is rapidly absorbed by the graft, which develops according to the quantity of substance X present, and when this is absorbed the cancer dies from want of nutrition. This is a very interesting explanation, but is it sufficient?

I hope that Prof. Petit, of Alfort, who is much interested in the question and always carrying experiments in his studies of cancers may at an early date give me the opportunity of reproducing some of the results he has obtained.

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AZOTURIA—HEMOGLOBINURIA.—Veterinary and medical papers here have recently published an article on this subject containing the observations, experiments and conclusions relating to it as published by a veterinarian, Mr. A. Lucet, Adjunct to the Museum of Natural History, and recently elected Member of the Academy of Medicine.

Considering first the nomenclature and the various names by which the disease is known, that of *muscular rheumatism of the hind quarters* (Weinmann, Leuchleutner, Frohner, etc.), of *hemoglobynemia* (Bollinger, Siedamgrotzky, Hoffmeister, Ellenberger, etc.), of *azoturia* at the time when uremic theory prevailed, of *essential paraplegia*, and finally of *medullary congestion*, by Trasbot, Mr. Lucet gives the affection the name of *Paroxysmic Hemoglobinuria à Frigore*, which he claims characterizes it well.

The various modes of manifestation are then presented with all their well-known peculiarities and the symptomatology is well considered as exhibited by the muscular apparatus, pointing essentially to myositis of various degrees, and which at post mortem are characterized by the aspect granular, dull red or greyish coloration of the muscular tissue, which is at times infiltrated with small ecchymotic spots and when cut through give escape to some serosity.

To the histological point of view, the muscular alterations reveal those of a toxic or infectious myositis. They are varied. In some places it is the irregular tumefaction of Virchow, in others the glassy degeneration of Zenker, or again the granular of Meryon, viz., fine granulations colored in dark yellow and seem to be due to a pigmentary alteration of the muscular homoglobine, or also in subjects whose death has been slow to take place, the interfascicular connective tissue shows a beginning of organization while the muscular fasciculi, surrounded with an exudate more or less abundant, presents numerous cellular elements thrown in series on their surfaces or in their thickness. These muscular lesions are for Lucet the pathognomonic ones of the disease, and after mentioning those which are found in the liver, spleen, kidneys and bladder which contains more or less of the characteristic urine, and passing a review of the conditions of the history in which the disease appears, the seasons, incubation, immunity, etc., the question is put: Is hemoglobinuria of horses of muscular or bloody, of toxic or infectious origin.

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From all facts considered, for Lucet it is *essentially a disease of muscles*. If hemoglobinuria was hemoglobinemia, the serum of horses which die very quick, and that one specially, ought to be strongly colored red. Besides this, in all animals that recover from serious or repeated attacks, an appreciable reduction in the corpuscles would be observed. Nothing of this kind exists. Again such serum has no hemolysing property. But besides, it has been proved that muscular hemoglobine will pass with the greatest facility through the renal filter and produces also hemoglobinuric deposits, even when its quantity in the bloody serum cannot be appreciated.

And now that the fact of the presence of myositis is well established, the mode of development of hemoglobinuria is easily to be explained:

"From the fact of the lesions of degeneration existing, the muscles lose their contractility, hence difficulty of locomotion. They leave off their hemoglobine in quantity. This is spread in the economy, impregnates it and promotes general phenomena of intoxication, so much more accused that the flow of hemoglobine is more rapid or greater. If then the progress of the myositis and its cause cease little by little, the osmotic tension of the organic fluid first increased is diminished, the equilibrium is reestablished and all the organs of elimination and transformation acting, the patient returns to his normal state.

"If on the contrary, saturated and not filling its part any longer, the renal epithelium refuses to work, it dies, it disappears. Then the kidneys are closed, anuria takes place, and, continually poured out, the muscular poison collects in the various organs and kills the patient.

"After all, death takes place through the kidneys under the form of a general intoxication, death which will be so much more rapid that the organ will have been affected from the start."

To the point of view of comparative medicine, the description and theory advanced by Lucet suggested an important question, namely: Essentially muscular in its nature, can this paroxysmic hemoglobinuria à frigore of horses be related to the

same disease in man, and can the history of the first throw any light on some points still obscure in the genesis of the human affection?

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OCCULT TUBERCULOUS INFECTION IN FOWLS.—The experiments are well known, which Director Arloing has carried out, and in which he has succeeded in giving to the tuberculous bacilli of mammaliæ (man or cattle) the vegetative and pathogenic characters, which had been considered before as belonging exclusively to the aviary bacilli, and which had for results to contribute to gather together the types of bacilli admitted by several authors and assimilate the aviary bacillus to that of mammalia. But the frequent failures of the experiments made to infect fowls with the bacilli of mammalia is yet taken advantage of by some bacteriologists who are desirous to keep up marked distinction in tuberculosis and who mention (to support their theory), the experiments of Strauss and Wurtz and those of Nocard where the fowls used for these experiments had failed to reveal any trace of macroscopic or microscopic lesions.

The question certainly was important and deserved positive settlement. It belonged to Dr. Arloing to try and succeed in settling it. To that effect he made experiments which he resumed before the Société des Sciences Vétérinaires of Lyon at one of its last meetings.

He took a number of fowls which he divided into lots of two. The birds of a first series (fourteen in number) were fed with tuberculous lesions of cattle. The birds of a second series received similar feeding made of humane sputa, very rich in bacilli. All the fowls were kept in best hygienic condition and were well fed. The results were that all the birds lost flesh sooner or later, had infiltrations of the sub-cutaneous connective tissue and among those that died, four had been fed with bovine lesions and two with human. Peritonitis was found in one. Pericarditis in another, but in none were tuberculous lesions apparent in any of the viscera.

But when histological examination of sections were made of the viscera and of the parenchymas of some, it was another story. In the liver of the four fowls that took bovine tuberculous matter, more or less extensive lesions of the liver were found, consisting in infiltrations by small round cells deposited inside or on the periphery of the hepatic lobules. Similar lesions also existed in the liver of the fowls fed with human sputa, but they were less numerous and smaller. The spleen was little affected. The kidneys also. In the lungs there were few small centers of broncho-pneumonia. The hepatic lesions resembled those which follow the inoculation of aviary bacilli in the peritoneum or under the skin of fowls. They recalled absolutely the hepatic lesions of the rabbit, after the intra-venous infection of human or bovine bacilli modified by culture in deep bouillon. Arloing considers them as tuberculous. They were found in most of the fowls experimented with.

Consequently, concludes the learned director, fowls are not as refractory to the bacilli of tuberculosis of mammalia as it is believed. The infection by ingestion can be manifested by occult lesions which are specially found in the liver.

These experiments establish beyond a doubt that fowls can be infected by feeding with mammalian tuberculous matters, human or bovine, and yet only present occult microscopic lesions. Anyhow microscopic lesions have already been obtained by Arloing and others in the liver, spleen and intestines of fowls being fed with homogeneous cultures of human and bovine bacilli, or with tuberculous viscera of rabbits and guinea pigs infected with sputa or juice of bovine lesions.

It was, however, very important to show that such a kind of lesions existed in fowls as well as in other animals.

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TUBERCULOUS MILK.—That milk of tuberculous cows is injurious is a fact which is generally recognized and the recommendation of almost all hygienists is to boil it before using it,

under the possibility (if that measure is neglected) of contamination. And yet it appears that there are pathologists who, if they do not deny the danger possible, they at least refuse to recognize it as great as it is by others. From that standing of ignoring all precautions, of boiling the milk before using it, it seems that there is but a short step. No doubt it is a very dangerous one.

Indeed in the *Deutch. Tier. Wochens.* there has been an article on the subject, where the question is put: *Is Milk Infected with Tuberculous Bacilli Very Dangerous for Man?* This appeared in the *Annales of Belgium.*

The German Imperial Bureau of Hygiene has ordered in Prussia, Bavaria, Saxony, Wurtemburg, Baden and Hesse, investigations to be made to the effect of establishing the respective importance of the digestive and respiratory apparatuses, as doors of entrance to tuberculous infection. District veterinarians were requested to inquire as to the use of milk coming from cows affected with mammary tuberculosis with elimination of tuberculous bacilli in the milk. These veterinarians carried their work from 1905 to 1909 and the general reporter mentioned in his official answer that 113 cases of mammary tuberculosis were found, 68 in Prussia, 14 in Bavaria, 6 in Saxony and Wurtemburg, 10 in Baden and 9 in Hesse. The milk of 69 cows was used during a very long time in its natural condition by 360 persons, among which 151 were children; that of the other cows was used after boiling by 268 people, among which were also many children. In the first group only two children, both aged two years, had tuberculous adenitis of the glands of the neck. Their parents, brothers and sisters, older, remained absolutely free from lesions. Nevertheless, the growth of the two tuberculous children was normal and the tuberculous inflammation subsided with time. Besides these two positive cases of tuberculosis due to the absorption of tuberculous milk, the report mentions twelve doubtful cases. The glands of the neck were enlarged, but no microscopic diagnosis was made, and a further examination revealed that, here again, the morbid troubles had subsided and disappeared. Other cases of tuberculosis were first

attributed to the ingestion of tuberculous milk but it was afterward demonstrated that the infection had taken place with bacilli of human origin.

Among the 268 persons which had taken tuberculous milk after being boiled, the cases of cervical adenitis were still greater; 12 cases among 133 children and one among adults.

The conclusions of the reporter were that the danger of tuberculous infection by ingestion of tuberculous milk is not as great as it has been believed up to this day, and it seems very small compared with that which results from immediate contact with persons affected with open pulmonary tuberculosis.

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ASINE TUBERCULOSIS.—Among solipeds, donkeys are the animals which have but little receptivity towards tuberculosis, and to overcome the resistance that they offer to experimental infection, it is necessary to resort to the most severe mode of inoculation, the intravenous injection. The resistance that they offer in regard to natural contamination is also very great, as in spite of the very defectuous hygienic conditions in which they are generally kept, tuberculosis among them is extremely rare.

There are the remarks made by Mr. E. Cesari in publishing in the *Hygiène de la Viande et du Lait* the result of a post mortem which he made of an animal killed at the Abattoir of Hippo-phagy. The case is probably the first one on record and certainly it deserves attention by the extent of the lesions and the peculiarities that those of the intestines presented, forming an entirely special type, without analogy with the various forms that may be found in intestinal lesions of tuberculosis of man or of the other animal species.

There were tuberculous lesions in both splanchnic cavities. In the thorax, those of the lungs were enormous. There were tuberculous masses of various sizes, white, compact and without any apparent marks of caseous degeneration. The visceral pleura was considerably thickened and on a level with the sub-pleural pulmonary nodules it formed true sclerous caps, covering the pro-

jection of the pulmonary tubercles. There were but few bacilli in the pulmonary lesions. The bronchial, prepectoral and mediastinal glands were enormous, hard and compact with few centers of caseous degeneration, where the bacilli were very abundant. In the abdomen, the peritoneum showed numerous flat patches of tuberculous deposits on the diaphragm. The liver, spleen and kidneys are also the seat of a great number of tuberculous nodules where bacilli are found. The abdominal glands were also diseased.

All these lesions which after all may be compared to the sarcomatous form of tuberculosis in horses may have been already observed, even in various conditions; but it is in opening the digestive canal that Cesari discovered the specific lesions and which at first glance he hesitated in considering as tuberculous.

"These lesions consisted in an hypertrophy of all the Peyer's patches of the intestines. In the entire extent of the mucous membrane, in the floating portion of the small intestines, the large and small colon, Peyer's patches formed projecting elevations, round or discoid, slightly cupulated, on their surface and looking somewhat like pants-buttons fixed on the mucous membrane. On the level with the ileum, the patches measured the size of one franc piece, say a twenty-five cent coin, they were in very great number and very close to each other. Absent, of course, in the cæcum, they were in the colon arranged in parallel rows along the great axis of the intestine. Over the patches, the mucous membrane had a honeycomb aspect. There were no ulcerations. In sections made for microscopic examinations, bacilli were found in the tuberculous nodules of the intestines." Inoculations to guinea pigs and rabbits were positive in their results.

In publishing this interesting post mortem, it is evident that the author desired to call special attention to those lesions of the intestines for their rarity first and again because they may have been present already in other animals and had not been searched for or had been overlooked.

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OVARIOTOMY IN EWES.—In the *Archiva Veterinara*, Prof. G. Podoska, of the High Veterinary School of Bucarest, publishes a new method to perform that operation in those animals which he calls *extra-peritoneal ovariotomy*.

He first recalls that ovariotomy in ewes is performed through the flank and then gives a minute description of the anatomical disposition of the genital organs of that animal, specially of the conformation and condition of the broad ligament, which allows the easy exit of the ovaries from the abdominal cavity and which the surgeon will do well to make himself familiar with.

To perform the operation which is executed on both flanks, the author uses a curved bistouri, a long-branch forceps (a Pean's model), two pairs of curved scissors, needles, silk and catgut, all well sterilized. A diet of twenty-four hours is necessary. The animal is kept standing or better laying down. The skin is shaved, washed and aseptized.

The various layers which are to be divided are: 1st, the skin, soft and very supple; 2d, abundant cellulo-adipous tissue; 3d, the muscle great oblique of the abdomen, thin with its fibres running obliquely downwards and from forwards backward; 4th, the small oblique whose fibres cross the preceding; 5th, the transverse muscle with its fibres almost vertical; 6th, the fascia transversalis or sup-peritoneal aponeurosis, and 7th, the peritoneum. The operation is divided in three steps:

1. *Incision of the Skin, Muscles and Aponeurosis.*—Three or four centimeters long, vertical or slightly oblique forward or backwards, shall be made four centimeters in front of the muscles of the thigh and will start 3 centimeters from the line which unites the transverse processes of the lumbar vertebræ.

2. *Exposure of the Ovary—Ligature—and Resection.*—The edges of the wound being kept apart, through the peritoneum, the broad ligament is observed; a gentle pulling on this brings the ovary in sight, when it is taken hold of with the forceps, leaving it covered with the peritoneum; a ligature is applied on the peduncle and the ovary excised.

3. *Suture of the Abdominal Wound.*—The muscles with catgut by Glovers stitches, the skin with interrupted stitches of silk. The wound is covered with collodion dressing.

After Care.—The ewe is given a good clean litter, and she receives half ration for a few days. Cicatrization is obtained generally in eight days.

Prof. Podoska has operated on quite a number of animals with this process and the recovery of his patients, some 35 in number, has been in eight or ten days by first intention. He insists on the value of the method which does not expose the animal to peritoneal infection and recommends its application principally for mares in which, he says, ovariotomy performed by the other methods is almost always followed by fatal complications.

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A WELL-EMPLOYED CAREER.—To change a little from serious subjects, let me finish in recording the balance sheet of a practitioner's thirty years' career, which I find in the *Revue Vétérinaire*. It is that of a country veterinarian.

Castration—3,018 bovines castrated by bistournage, 40 bulls operated with uncovered testicles, 430 horses with clamps, 35 cows ovariotomy, few jackasses and male mules emasculated. No accident complications or fatal ending.

Bleeding, 2,640; Setons, 150. Obstetrical Operations.—Out of 270 accouchements, failures were about 1 per cent.; 2,400 artificial and late deliveries without bad results; 180 reductions of uterus and 10 Cæsarian successful operations.

Amputations of horns, 150 a year; prolapsus of the rectum, 2 in bovines, 2 in dogs, 30 in horses, 450 in swine. Bad results only in those were below 1 per cent. Firing 14,685, without accidents.

Among the diseases treated are mentioned: 5,400 cases of anemia in poorly fed cattle, lymphademia in bovines, lymphangitis, sore throat, anasarca, chorea, conjunctivitis, enteritis, urticaria, diarrhoea, 3,132 cases of parturient apoplexy were treated;

54 of fistulous withers; 10,500 of indigestion; 2,400 of tympanitis; 5,160 of gastritis or gastro-enteritis. Without counting numerous cases of mammitis, of arthritis, nephritis, colics and ureteritis, foot and mouth disease and tuberculosis.

This is certainly a professional life which has been well filled. And yet it is said that the financial returns were, what I would call, more than insignificant.

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BIBLIOGRAPHY.—It is some little time since I have received the twenty-fifth annual report of the Bureau of Animal Industry for 1908. When I say some little time, I ought to add too late for me to notice it last month. After this apology, let us look into it.

This report is always the same book, same form, same printing, about same size and always the same nature of contents, viz., evidences of the excellent work done by the bureau and record of the valuable publications coming from the various departments of this great organization, superior to any all over the world and which has rendered such services to agriculture, saved so many millions to the United States and beyond doubt has proved that *veterinarians alone* are the scientists in whose hands its successful running can and must be left.

As it is known the organization of the bureau with its principal officers, Dr. Melvin as chief and A. M. Farrington as assistant chief, is divided into a number of divisions. At the head of each of those, there is also a chief and altogether almost the entire staff is composed of members of the veterinary profession and naturally the principal bulk of the contents of the twenty-fifth report is from veterinarians.

The chief, Dr. Melvin, besides his own report, has reproduced his article on "The Economic Importance of Tuberculosis of Food-Producing Animals," which met with such a success at the International Congress on Tuberculosis in Washington, and also the paper which he presented before the A. V. M. Association in Philadelphia on "The Control of Hog Cholera by Serum Im-

munization," and the circular relating to "The 1908 Outbreak of the Foot and Mouth Disease in the United States." The assistant chief, Dr. Farrington, has an article on "The Need of State and Municipal Meat Inspection to Supplement Federal Inspection."

The Pathological Division is represented by the several publications from Drs. J. R. Mohler and Henry J. Washburn "Causation and Character of Animal Tuberculosis and Federal Measures for its Repression," "Transmission of Avian Tuberculosis to Mammals," "Infectious Anemia, Mycotic Lymphangitis and Chronic Bacterial Dysentery," "Malta Fever and the Maltese Goat Importation," "Vitality of Typhoid Bacilli in Milk and Butter," "The effect of Smelter Fumes Upon the Live-Stock Industry in the Northwest," by Dr. R. J. Formad, of the same division.

From the Biochemic division, there is from Dr. W. B. Niles, "Field Tests with Serum for the Prevention of Hog Cholera." The experiment station with Dr. E. C. Schröeder, superintendent, is found with his article on "The Relation of the Tuberculous Cow to Public Health."

The illustrations of the report consist in eleven large plates and seventy-two figures in the text. Considered as a whole, the twenty-fifth annual report, if it contains the majority of publications already issued in the shape of circulars from the Bureau, it forms a most valuable volume. It has already been my pleasant duty to call the attention of our readers to these publications as they have come to me, some of them have already appeared in our pages, but yet it can do but good to recall their titles, the names of their authors to make parties interested get them, read them and benefit by their contents.

It is by such good work that veterinarians can be appreciated!

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KOMPENDIUM DER AUGEWANDTEN BAKTERIOLOGIE FÜR TIERARZTE.—(Compendium of Applied Bacteriology for Veterinarians) is a little volume of 272 pages by Professor F. Glage,

Chief Veterinarian to the Hamburg Veterinary Department, and published by the well known firm of Richard Schoetz, of Berlin.

Illustrated by sixty figures in the text, this book is presented as a guide to serve to veterinary practitioners as well as to those who are engaged in meat inspection and in control of food inspection, considering as it does the most important parts relating to bacteriology. With this object in view, which the author has endeavored and succeeded in realizing, he has divided the contents of the compendium into eight chapters in which he treats of the organization of a laboratory, of the microscope and its accessories, and after a concise consideration of the methods used in bacteriology, of the media of cultures, etc. In a special chapter he examines the various methods of investigation, selection of material, cultures, inoculations, etc. In another chapter, general notions are given on microbes, and this is followed by one on the application of bacteriology to veterinary practice. This subject of bacteriology of diseases is divided into two groups and that relating to the inspection of meat embracing all kinds of food products has received from the author minute attention. The last chapter treats of milk control and is well treated.

All the chapters contained in the Compendium are very interesting and presented in a comparatively concise but yet clear and comprehensible manner. It will prove a valuable little addition to the literature on the subject and by the complete index of the last page gives to the busy worker a rather complete and compact list of books of reference.

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PAMPHLETS RECEIVED.—Volumes 3 and 4 of *Veterinary Journal from Dorpat*; May and June issues of the *Agricultural Journal of the Cape of Good Hope*; *The Transvaal Agricultural Journal*; *The Journal of the McKillip Vet. Coll. Alumni Association*; *Chicago Veterinary College Quarterly Bulletin*; Bureau of Animal Industry Circular 153 on the "Dissemination of Dis-

eases by Dairy Products and Methods of Prevention"; the third annual report of state veterinarian of Alabama, Dr. C. A. Cary, and Veterinary Notes from Parke, Davis & Co.

A. L.

OFF TO THE A. V. M. A. CONVENTION.

When this number of the REVIEW reaches the subscribers' desks, many of them will have already departed for what promises to be the greatest veterinary convention ever held in this country, and at the same time, the one farthest from a central point. This is most gratifying because it is an index of the strength and earnestness of the organization which does not permit distance to deter it from responding to a call of the cause.

Every veterinarian that can possibly do so, whether he be a member of the American Veterinary Medical Association or not, will go, and hundreds of new names will be enrolled on the membership list during the several days' sessions at San Francisco, September 6 to 9; so that the organization, like its individual members in attendance, will gain in strength and health and wisdom as a result of its visit to the progressive westland; and those of its members and others in the profession who cannot find it convenient to go, will be kept in touch with what has been accomplished there, through the medium of their faithful chronicler of veterinary matters in its next monthly visit to their offices. God speed those that are starting on their yearly pilgrimage, and God bless those others faithfully performing the duties which necessitate their remaining at home.

THE RETURN OF THE HORSE FOR FASHIONABLE PURPOSES.

"Indications are by no means wanting that a reaction is setting in which points to a return—at least for fashionable purposes—to the horse and carriage, and a desertion of the auto-

mobile, at least for social events in which ladies play the leading part. Ladies as a rule are the very first to discover what best suits them, what lends most to their attractiveness, and what is the least common and most exclusive way in which they can occupy the pleasant hours of their fortunate existence. Made to be admired, born to be sought and courted, they have lain hidden behind the masks and goggles and dustcoats of automobile armor much longer than their sharp perception would give them credit for. Woman, for once in her life, lured by the speed and excitement of automobiles, has actually forgotten herself until she has discovered that gallant youth is turning toward the prettier and more attractive form of gracefully attired beauty in a splendidly appointed park phaeton, or in a smartly cut and exquisitely fitting riding habit, while her willowy form swings bewitchingly to the every movement of her thoroughbred mount. How it is that ladies have so long forgotten themselves is past the understanding of the opposite sex who have known them so long, wooed them so persistently, and admired them so thoroughly. Perhaps it is the men after all who are accountable for it, but, be this, however, as it may, the ladies are changing, and in devout thankfulness we fall upon our marrow bones and murmur, 'Thank God.'"

The above is at once so encouraging to veterinarians and so characteristic of the editor of *Bit and Spur* that we have lifted it bodily from the editorial columns of that most excellent periodical (August 1910) and reproduced it for our readers.

The REVIEW predicted the return of the horse among select circles in reporting the unusual success of the last national horse show at Madison Square Garden, New York, in November, 1909, but did not *directly* credit the ladies as being the medium through which it was to be accomplished. If the editor of *Bit and Spur* is correct in his deductions (and we believe his judgment excellent in matters where ladies are concerned), then indeed we have cause for rejoicing. For what the ladies want is what the men provide, and, besides, it costs much less to provide and maintain a beautifully appointed horse-drawn turnout

than to maintain automobile turnouts, the most expensive of which are wanting in *finesse*, and lack the beauty and dash of a "coach and pair."

A REPLY TO DR. OLIVER.—One of the REVIEW collaborators, replying to Dr. Oliver's request for an expression of opinion as to what the case he describes on pages 657-8, August REVIEW, was, says: "From Dr. Oliver's description of the lesions manifested in the Berkshire boar in question, particularly with reference to the appearance, size, consistency and location of the cysts, it seems quite evident that he was dealing with the *Cysticercus cellulosae*, the larval stage of the *Taenia solium* of man, otherwise known as the pork measles." As this expression comes from an authority on pathology, we feel sure that Dr. Oliver will be pleased to have it published for the benefit of his brothers in the profession, thereby making his article doubly valuable.

HORSE SHOW ON THE MINNEWASKA.—When the steamship *Minnewaska* reached the port of New York, from London, she had 226 horses on board—a rare selection of draft breeds consisting of French Shire, Percheron and Belgian stallions and mares.

The owners of these beautiful animals were Samuel Bell and William Bell, of Wooster, Ohio; Worth Dunham, of Wayne, Ill.; J. Hamilton and Mr. Hawthorne, Canada; E. Hobson, Clifton, Ill.; W. V. Pewis, Wayne, Ill.; W. E. Pritchard, Ottawa, Canada, and J. G. Truman, of Bushnell, Ill., and these gentlemen conceived the idea of holding a horse show on the steamer, and quickly put their ideas into execution. The entries were gotten ready rapidly and Mr. Edwin Hobson was appointed judge. An entry fee was charged, which was divided up as prize money. The show was held between decks, and, while the parade was somewhat restricted, great enthusiasm was felt by the exhibitors, and the passengers participated in an enjoyment never before experienced at sea.

Dr. L. M. STECKEL, formerly of Columbus, O., holds the position of "Special State Dairy Inspector of California."

ORIGINAL ARTICLES.

SOME EFFECTS OF INTERNAL ADMINISTRATION OF CARBOLIC ACID.*

By L. M. HURT, EAST LANSING, MICH.

In selecting this subject as a topic for study I have been prompted by curiosity aroused by the peculiar and suggestive nature of several cases which I have had occasion to observe during the past year. While these cases were suggestive of poisoning, they were perplexing at the time, and the relation between them was not at first well defined; especially since they were so oddly at variance in the more prominent symptoms displayed. When carbolic acid poisoning was finally decided upon as a working hypothesis, many problems presented themselves for study, all of which were exceedingly interesting. When worked out as well as possible under the limitations imposed by the facilities at hand and by the almost entire lack of literature upon this particular line of work, it became plain to me that there was involved a phase of carbolic acid poisoning which was important, which had received but little attention at the hands of toxicologists and practitioners, *i. e.*, the cumulative effect of the continued use of carbolic acid in sublethal doses.

Its study is opportune because of the rather widespread use of carbolic acid in the treatment of Contagious Abortion at the present time. (This report of cases and discussion of the phases of poisoning produced is not to be taken as an argument against the use of carbolic acid in this connection, as its toxic action in two of the cases was influenced by conditions for which the treatment was in no way to blame. I am of the opinion, however, that

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a reduction of the time over which the treatment is extended would not detract from the efficiency of the same, and would probably obviate the embarrassment of having to treat a few animals for the character of disorder which I will describe.)

A BRIEF RESUME OF THE NATURE OF CARBOLIC ACID, ITS ACTIONS, USES AND TESTS.

Carbolic acid is variously known as phenol, phenyl alcohol, phenilic hydrate, phenic acid and coal tar creosote. It crystallizes in long prisms which melt at 41-40 degrees; when melted forms a colorless limpid liquid boiling at 182 degrees, and distills without decomposition. The pink, red or brown color which it sometimes possesses is in proportion to the amount of impurity contained. It does not redden litmus paper, but produces a greasy stain upon paper which disappears upon exposure to the air. It has a peculiar aromatic odor, burning numbing taste even in small strengths; burns with a sooty flame at high temperatures. It dissolves readily in benzine, carbon bisulphide, chloroform, ether, and mixes in all proportions with glycerin, alcohol, glacial or acetic acid; it coagulates albumen, the precipitate being dissolved in excess of albumen; it dissolves iodine without changing its properties; it dissolves many resins, also sulphur.

It was discovered in 1834 by Runge and has been used very widely since its antiseptic properties were brought out so strongly by Lister in 1863. It has many uses in medicine which are somewhat varied, but by far the greatest amount is used as a disinfectant. It is used in the manufacture of salol, salicylic acid, and several dyes. It has many market forms, including various liquid preparations containing varying strengths of carbolic acid, alone or in combination with cresol or cresylic acid. Carbolic soaps and powders differ in carbolic content up to 10 per cent.

Tests, Bromine Test.—A precipitate of tri-bromo-phenol is rapidly or slowly formed, according to the amount of phenol present in the tested solution, by the addition of bromine water to the suspected solution. From this precipitate a quantitative calculation of its presence may be made.

Euchlorine Test.—Concentrated hydrochloric acid is allowed to act upon potassium chlorate for 30 seconds, then diluted with $1\frac{1}{2}$ volumes of water, remove the gas by blowing, pour in a layer of strong ammonia. Blow out the fumes of ammonium chloride and add a few drops of the suspected solution, whereupon a rose-red, blood-red, or red-brown tint will appear, according to the amount of phenol contained in the sample.

Ferric Chlorid Test.—When ferric chlorid is added to a solution containing carbolic acid, a violet color, or deep purple when in urine, will appear, but on account of the action upon neutral salts and other substances which may be present in urine, the reaction may be attended by a mauve color and be open to question. Where care is used, however, this is a delicate test, as phenol is recognized by this means when present in exceedingly small amounts.

Ammonia and Soda Hypochlorite Test.—Solutions containing 1-5,000 will show test. Add one-fourth the volume of ammonium hydrate to the suspected solution and then a small quantity of sodic hypochlorite solution, avoiding excess. A blue color appears and is persistent and perhaps hastened by boiling. Even smaller quantities may give this test if allowed to stand.

Quantitative Analysis of Urine with Barium Chloride Solution.—The normal sulphates are precipitated in cold solutions by barium chlorid and acidulating with HCl. Then boil the solution and a second crop of precipitate is obtained which represents the precipitated sulphate formerly combined with phenol. From the weight of this precipitate the amount of phenol is determined by the following formula: $C_6H_5HSO_4 : BaSO_4 :: 174 : 233$.

Uses.—The use of carbolic acid in human medicine has always been attended with a certain amount of misgiving because of the well known fact that idiosyncrasy is often encountered in which serious if not fatal poisoning results. This has been true under a variety of conditions, both in external and internal administrations. Quite a range of susceptibility has also been observed among domestic animals, not only among species, but among animals of the same species, a fact which applies equally

well to all medicines and must be borne in mind in their use in our practice. Young animals are more susceptible than old ones to carbolic acid poisoning, and its use in any form seems dangerous in cats, less so in dogs. Absorption from the skin has been repeatedly demonstrated in thin-skinned animals, and when applied warm or in a warm room, is believed to occur in the larger domestic species.

Respecting this well-established danger of fatal results, its use internally in human practice has gradually narrowed down almost entirely to the checking of profuse intestinal secretions, and to its antifermentative action. It is found highly useful in cases of ichorous eructations or disagreeable emanations of any character due to fermentation or putrefactive agencies, not because it is a successful deodorant, since it is a failure in this respect.

In veterinary practice it has been used internally in various strengths and forms in the treatment of influenza and tetanus of horses contagious pleuro-pneumonia and Texas fever of cattle, anthrax of cattle, sheep and horses, septicemias of various natures, and in numerous cases giving a foul discharge due to putrefaction or gangrene, as in septic pneumonia or gangrene following severe pneumonia or strangles. The dose varies considerably according to different authorities, some giving as low as 15 minims, others up to two and one-half drams, for the horse and cow. While one-half-ounce doses have been given to these animals and even one-ounce doses have been recorded without serious results, it is generally conceded that except in cases of emergency, this sized dose is to be considered dangerous, and the risk is not justified. Most authorities seem to gather around two drams as the maximum dose for a thousand-pound animal, figuring four drams as the minimum lethal dose.

Carbolic Acid Poisoning.—Unfortunately the term carbolic acid has been applied by laymen as well as medical men to almost all forms of disinfectant solutions containing coal-tar products, some of which contain but a very little phenol. This has given it a prominence as a dangerous poison, which it is thoroughly capable of fulfilling, but is not guilty of.

Acute poisoning is by far the most common form, marked by sluggish pupils, sometimes contracted to pin-point size, others dilated, faintness, staggering gait, clammy, cool and perhaps moist surfaces, pulse small and wiry, dyspnoea marked, the breathing becoming more and more shallow. Death results from respiratory failure in these cases, as the heart often beats for some little time after respiration ceases. Convulsions may be noticed, especially in the smaller animals. This may be general, or confined to one or a few limbs. Coma is marked in most acute cases, while in those of longer duration and less serious nature, cerebral disturbances of a varied nature may be expected.

In all cases changes from very slight to very marked are noted in the urine. (It appears in solution largely in combination with sulphuric acid and potassium as sulpho-phenic acid, or phenol-sulphuric acid ($C_6H_5HSO_4$) or more correctly, potassic phenol-sulphuric acid ($C_6H_5KSO_4$).) It is well known that hydroquinone and pyrocatechin are constant productions of a part of the phenol. A portion of the hydroquinone existing in the free state assumes a brown color. The separation of the carbolic acid by the kidneys begins almost immediately upon the absorption of the same into the circulation, and continues for 12-24 hours or longer, depending upon the fullness of the stomach. It is therefore continued over a much longer period in ruminants than in other species. It occurs in such quantities during this period of elimination as to make its presence unmistakable as compared with the small amount which is often found in the urine of herbivora, and occasionally in other species. The urine is darker than normal, sometimes assuming a dark brown color, which has been mistaken for hemoglobinurea. It may have a carbolic acid odor. Taylor, in his work upon Poisons, Their Nature and Detection, mentions the fact that dark green or purplish color may occasionally be noted in the fecal discharges.

Post-mortem examination is in the main disappointing. Aside from the eschars formed by the direct action of the acid, and the actual detection by the sense of smell, or by proper tests, of the presence of the acid, little else may be expected. No special organ

seems to be affected by its presence in dilute solutions, such as would be found in the circulation, with the single exception of the kidney, and occasionally the liver. The kidneys show signs of acute inflammation, no matter what the method of administration may be, giving rise to darkened urine containing casts and albumen. The cerebral disturbances are sometimes explained upon finding the vessels of that region engorged with blood, and the amount of fluid in the ventricles is likely to be increased. In such cases, the disturbances of the vaso-motor system is sufficient to account for the changes, but in the more acute cases, there is little doubt but that direct cerebral poisoning occurs. That the vaso-motor tone is destroyed is also manifested by the condition of the abdominal vessels which are uniformly distended and engorged. Even the smaller arterioles are noted for their distended appearance in these cases. The blood itself may not be greatly changed, although it is noted that it coagulates slowly. Its character probably depends more upon the character of the breathing immediately preceding death, than upon the change wrought by the presence of the acid. Echymoses in the lungs and pleurae are occasionally noted, and may be ascribed to the same cause, *i. e.*, paralysis of the vaso-motor system.

While a direct action upon the heart is possible in acute cases, it is altogether probable that in those cases of mild poisoning where increase in the force and frequency of the heart's action is noted, that is results from depression of vaso-motor tone, or obstruction to circulation offered by congested kidneys, or both. To affect the heart, it has been shown that very large doses of phenol must be given, and then a depressant effect is noted, not an increase, except temporarily.

Treatment.—Give albuminous drenches. In case of small animals and the horse, endeavor to remove the contents of the stomach, but it is well to remember that a syphon or pump must be used in vomiting animals, since the nerve supply of the stomach is so depressed that emetics will not work. Any sulphate is a direct chemical antidote, sodium sulphate being ordinarily advised in this connection because it is readily procured. This

has been advocated at different times by Baumann, and Sonnenberg *et al.* Dr. David Cernea, of the Pharmacological Laboratory of the University of Pennsylvania, proved the applicability of sodium and magnesium sulphates as a treatment, by experimental work upon animals (as reported in the *Philadelphia Medical Times*, IX. 592). He gives as the reason for this antidotal action, the formation of innocuous phenol-sulphates. As the sulphates are innocuous, they should be given in excess. (It is also noted that phenol combines with glycuronic acid and forms a harmless substance.) It is believed by some that the degree of poisoning is determined, or rather, limited by the extent to which the phenol is thus combined. Indeed it is definitely stated that phenol in dilute solutions is not poisonous until the amount is greater than can be neutralized in its effects by the above-mentioned combinations.

(Some clinicians use as a guide, the amount of sulphates in the urine. So long as barium chloride produces a precipitate which is about normal in amount, which is insoluble in hydrochloric acid while cold, they feel safe to continue the use of phenol. This same applies to the use of kresol and other coal tar derivatives. However, the conclusion that the sulpho-carbolates are harmless is not justified from experience, and we had better regard them as being less dangerous than phenol itself. There is grave probability that the action upon the kidneys is at all times marked, very possibly upon other organs as well.)

The following cases present in some instances perfect exemplification of some of the symptoms noted above, but in the main will be found to differ considerably, not only from descriptions of typical cases of carbolic acid poisoning, but from each other as well.

REPORT OF HOLSTEIN COW.

Wednesday, March 17, 1909, 8.30 a. m. Holstein cow 6 years old, in calf about eight months. Weight, 1,300 pounds. Has been dainty on dry feed for past few days, and failed to eat hay or silage on previous evening, at which time some bloating

was noted and she was placed in a box stall. Examination showed the presence of considerable flatulence; respiration, 82; pulse, 90; temperature, 103.1° F. Muscular tremors were marked especially in the neck and hind quarters; uneasiness was noticed, and occasional bellowing; few thin feces had been passed during the night. Urine was passed during examination, and was not of a character to excite any comment. The case seemed to be of the nature of indigestion, and treatment was prescribed accordingly, including placing of trocar and cannula and introduction through the cannula of one quart linseed oil and one ounce of creoline, and a quarter of an hour later one-half pint of alcohol, two ounces spirit nitrous ether, and water to make a pint. At noon one more quart oil and one ounce turpentine was introduced and the cannula withdrawn. (Respiration, 62; pulse, 70; temperature, 103.3° F. General expression better, and she was left lying comfortably. At 5.30 no appreciable change could be noted in condition. Respiration, 50; pulse, 65 and temperature, 103.4° F.)

Thursday, 7.45 a. m. Respiration, 54; pulse, 60; temperature, 102.8° F. No feces passed during night. Some gas had accumulated, which passed off with walking exercise. Examination at this time revealed the fact that movement of the rumen, in spite of its relaxed condition, was very slow and lacking in tone, movement occurring at intervals of one and one-half to two minutes. Prescribed one pint of oil to be given three times during the day, and tempt the appetite with roots and silage in small amounts at frequent intervals, and to report changes, if any, during the day.

Friday, 8.30 a. m. Small amount of feces during the night, but action of rumen still very slow. Respiration, 24; pulse, 54; temperature 103° F. Made rectal examination to ascertain condition of fetus, which though difficult to reach was found living. Enema brought about a peck of dried feces in addition to the amount removed by hand from rectum. Left tonic prescription, and directions to give oil as upon previous day, the second dose

to contain eight drops croton oil. 5:15 p. m., animal resting quietly and no examination made.

Saturday, 9:00 a. m. Respiration, 24; pulse, 56; temperature, 103.6°. Slight passage of feces during the night, and slight one during morning, assuming a watery consistency and foul smelling. General demeanor dull. Repeated tonic prescription and directed that the animal receive walking exercise.

Sunday, 9:45 a. m. Considerable uneasiness displayed. Bowel passages thin and watery, greenish in color, and very foul; scant in amount. Drank some water for the first time. Gave a pint of oil, and directed that another be given in the evening, and that she be exercised during day at least one-half hour. 4:00 p. m., resting quietly.

Monday. Bowels still discharging watery stools, slight in amount, very foul smelling. Abdomen very pendulous and atonic. Attendant observed that it smelled as if they had been disinfecting the stable, but even then the thought did not enter my head that it might be a case of poisoning due to carbolic acid or any other medicine which may have been given. No apparent change during the day.

Tuesday. Respiration, 26; pulse, 58; temperature, 104.1° F. Slight passage during the night of a little firmer consistency, but dark colored. General demeanor seemed brighter, and she looked for water, but refused silage and other feed.

Wednesday. Decidedly worse, showing cerebral disturbances much more prominently than heretofore, standing with the head pressed up against the corner, bellowing often. Bowels discharging a thick dark green fluid. Flushed out rectum with cold and warm enemas, and examined calf, which was found to be very active. Prescribed tonic of nux vomica and alcohol, and walking exercise during day.

Thursday. No improvement, except the cerebral excitement was less marked. Abdomen painless and pendulous. Gave tonic prescription, and directed to have rectum washed out three times during the day. Respiration, 28; pulse, 66; temperature, 103.4° F. Two pails of water were taken just after dinner.

Friday. Respiration, 23; pulse, 72, and much weakened; temperature, 104.2° . Staggering gait noted, and from general condition it was seen that she would not last long. More out of curiosity than from any other reason a stomach tube was passed and I endeavored to extract a sample of the ingesta, but failing in this I introduced a pail of water at body temperature, and attempted to siphon out some of the contents. Only a small amount of dirty greenish sour smelling water returned, before she went down. Gas formed rapidly during the morning, requiring the use of the trocar and cannula. She was led out into the yard and allowed to lie in sunshine under blanket during the morning. At noon she was aroused, got up readily, walked in the barn to her stall, fell over and was soon dead.

Post mortem revealed presence of well-developed foetus of between seven and eight months old. The digestive organs were clear of inflammatory appearances, but the festoons of intestinal vessels were highly engorged with dark blood. Blood coagulated very slowly and feebly. Heart seemed to be softened slightly, but this was not verified by microscopic examination. Pericardial sack was quite full of sanguinolent exudate. Liver quite firm, but samples of same taken for examination did not show marked change from normal. State of food in stomach suggested that little motion had taken place for several days, and the odor of the food was strongly suggestive of dead oil. Lack of putrefaction was marked. Paralysis of the rumen seemed apparent, but cause for the same was apparently lacking. However, since the appearance of a second case with much the same symptoms, and upon learning that the carbolic acid treatment had just been completed for a period of ten days, samples of ingesta and urine were taken for analysis. Cotyledons of uterus much enlarged, and fetal cotyledons showed some degeneration with purulent exudation, which so far as I could determine by use of microscope was non-specific. The kidneys showed plainly an inflammatory condition, the left one being about one-fourth larger than the opposite one, and showing numerous darkened areas upon surface, and cloudy appearance of pelvis. Some debris

in the pelvis of each kidney proved on examination with microscope to be cellular material. The glomeruli were uniformly enlarged and surrounded by an inflammatory zone, or else by an area of infiltration. The structure of a portion of the convoluted tubules was in a state of parenchymatous degeneration, some of the cells even suggesting in their appearance fatty degeneration. Cellular material and other debris was noted in the convoluted portions, which formed well defined casts in the straight portions.

The samples of ingesta and urine taken at the time of the post mortem were analyzed by Dr. Jodidi and myself upon the 29th, at which time a sample of the urine of second case of this nature was tested. Both showed unmistakably the presence of phenol. This urine was taken nine days after the administration of the last dose of carbolic acid, and showed that it had been retained in the system to a considerable extent.

REPORT OF GRAY SHORTHORN Cow. (26b.)

First showed symptoms of constipation and inappetence March 22d with general symptoms a great deal similar to those noted in the Holstein cow, *i. e.*, those of general depression and attending indigestion. Respiration, 21; pulse, 60; temperature, 103.2° F. Contents of the rumen so far as could be determined from external examination, normal in amount and consistency. Questions upon history of case brought out the statement that upon the 20th she, like the others in the stable, had just completed a ten days' treatment with carbolic, during which 140 c. c. of a 5 per cent. solution were given daily in the feed, and 30 c. c. of the same strength solution was injected under the skin of each animal. (2-2 $\frac{1}{4}$ dr. c. a.)

Prescription given with intent to counteract the effect of any phenol that might be present in the system, *i. e.*, sodium sulphate, iron sulphate, and sodium bicarbonate, in Rx 121. To assist in bowel movement raw linseed oil was prescribed in pint doses twice daily to be continued until further orders.

Tuesday 23d, Wednesday 24th, Thursday 25th, no apparent change in condition; small movement of bowels occurring

daily of normal consistency; temperature remaining very steady, *i. e.*, hovering around 103; heart action in general strong; pulse running from 48 to 60; respiration nearly normal except when forced to move; movement of the rumen very slow, occasionally occurring as slowly as once in two minutes; rumination entirely absent.

Friday 23d. Dark green discharge from the bowels commenced early in morning and continued at intervals of about two hours during the day and becoming progressively more watery. Depression increased; heart action continued firm but quickened, rising from 55 to 65 during the day; temperature, 103.4° F.; no feed touched during the day, although tempted several times with roots, silage, and bran mash; surface of body quite warm, especially about the head and ears and base of horns. Slight movements of rumen occasionally attended by a belching sound, but no actual rumination. Abdomen pendulous and slack in morning, became slightly distended with gas during the day, but this passed off with walking exercise. To prevent recurrence of this symptom one-half ounce of creolin was added to the evening dose of oil.

Saturday 27th. Respiration, 22; pulse, 66; temperature, 103.8° F. Normal passage of dark green foul-smelling excrement during the night which was observed to smell somewhat similar to that of the Holstein cow. (Manly.) Depression continued and somewhat increased, to which was added some cerebral disturbance manifested by the pressing of the nostrils against a projecting object for several minutes at a time. Action of rumen very slow, only occurring at intervals of very nearly two minutes. Gave tonic prescription containing nux vomica, gentian and alcohol; discontinued use of oil and reduced dosage of sulphates one-half, also directed walking exercise be given at least three times during the day, and for not less than one half hour at the commencement, in addition to what exercise she would take in the exercise lots with the other cattle.

Sunday, Monday and Tuesday brought no apparent change in condition, except a gradual improvement in tone of rumen,

and perhaps in body. Continues to press nose against objects, although not so frequently, nor for such long periods as before. Has commenced to lick the ground and at the cement wall of the tank. Urine sample taken on Monday 29th showed presence of phenol in well-marked quantities. This was somewhat surprising, considering the fact that nine days had elapsed since the administration of the last dose.

Wednesday, April 1st. Slight appetite shown, especially for the dry feeds; appetite for dirt and tendency to lick walls continues. Salt was given, but little was taken; movements of the rumen increased in force and frequency, and general expression much improved. Respiration, normal; pulse, normal in count, but a little soft; temperature, 103° F. Sample of urine showed the presence of phenol in fairly large amounts. Test sample taken from three cows standing near her showed *no phenol present*.

Friday, April 2d. Exercises were continued, no medicine prescribed for present. Appetite increasing, ate a few roots, and a small bran mash; feces assuming a more normal appearance and consistency. Walking exercise was willingly taken, traveling as far as Grand Trunk Railroad crossing at least once during the day.

Saturday, April 3d. Careful examination made of all parts of exterior and found animal seemingly recovered except in flesh. Temperature, 102.6° F. Subsequent taking of temperatures during the test showed that her temperature was normally high. Advised increasing her feed cautiously. Morning's milk, 6 pounds. (Milk flow had almost entirely ceased.)

April 5th. Milk yield increasing steadily; appetite voracious; general demeanor contented and spirited. She received half feed, and received full feed at the end of ten days following. Recovery uneventful.

RED SHORTHORN COW.

March 28, 1909. Call by Brown. Cow had been in hospital barn for over three months, having been confined therein for

abortion, at which time she was ill for an extended period previous to and subsequent to the abortion. First illness was marked by extensive depression of the digestive apparatus, constipation alternating with occasional extremely liquid foul-smelling diarrhoeal passages. This was complicated by medication pneumonia brought on by the administration of a dose of oil by one of the attendants. During this period she was extremely lame in the left posterior, due to a bruised fetlock. The abortion may have been specific, or due to the symptoms and conditions mentioned, these having been of sufficiently severe nature to have caused it.

The first symptom of indigestion occurred during a course of treatment with carbolic acid for contagious abortion extending over a period of ten days. She went off feed gradually, and little was thought of it till the bowel passages almost ceased, when she was given the dose of oil above mentioned with the results given. At this time I first saw the case and prescribed hot applications to the abdomen, and daily dosage of strychnine and digitalis. After the abortion occurred, which was close to one month after the first appearance of sickness, she seemed to do better for a time, appetite returned, rumination became normal, or nearly so, but the pulse and respiration have been too rapid. The aborted calf was about six months along, dead, but not decomposed.

Upon the date mentioned, Friday, 28th, she was found to be quite depressed, coat harsh and erect, ears cool, limbs cool, but general surface of the body warm and markedly dry. Abdominal region retracted, but showed no pain or tenderness under pressure. She had eaten but little during the past twenty-four hours, and at the time of examination was chewing listlessly at a small bundle of hay, the roots and silage remaining untouched. Respiration, 44; pulse, 100; temperature, 102.6° F. Auscultation with the phonendoscope revealed a very marked renal pulse, especially over the region of the right kidney; heart's action as easily auscultated over the right side as upon the left. This upon examination proved to be due to the lower half of the right lung being non-functional; there was also found localized consoli-

dation of the left lung. The heart's action while giving a fairly strong pulse, was rather shallow, but heart sounds were normal. Feces passed during examination were normal in color, but small in amount.

Recommended that the animal be given regular exercise, put out of barn as much as possible, and as early as practicable, that she be put in pasture. No hope was held out for her recovery, since the examination seemed to indicate that she suffered from conditions of a chronic nature which would militate against her gaining flesh, or making a complete recovery for breeding purposes. Her age was in her favor, however, and since she was a valuable animal in health, it was decided to treat her. Rx. 126 containing tr. chl. iron, tr. gentian, fl. ext. nux vomica and alcohol was given for the purpose of stimulating the nervous system, assisting digestion, promoting appetite, and the iron as a general tonic. Observations at frequent intervals during the two weeks which followed revealed no apparent change in condition, except slight fluctuation in appetite, which at no time assumed a favorable condition.

June 8th. This animal reported as having made some gain during the past month, and being in better tone and condition, but had not yet been turned out to pasture, a condition which would probably result favorably in her case.

BROWN SWISS COW.

May 8th, Sunday, 5.30 p. m. Cow in only fair condition, having calved but two weeks ago, and having had horns removed but a week ago. Dehorned because she had broken off a piece of left horn at watering trough. Reported as having been a little finicky about feed for about a week, but had not stopped eating until to-day. Had shown peculiar symptoms during the day, such as raising the hind feet, holding hocks flexed for a few moments, then straightening the leg backwards a few times with a slight kicking motion before replacing the foot upon the ground. Was unsteady upon here feet at times, and when caused to walk, showed a distinct wobble in gait occasionally. She stood with

her nose pushed against objects for several minutes at a time; eyes dull, lids heavy; ears warm, muzzle dry; pulse, 68; respiration, 24; temperature, 101° F. Contents of rumen less than normal, but seemingly normal in consistency; urine and feces passed during examination and were apparently normal in color and consistence.

The violence of the heart beat overlooked until by chance my thigh came in contact with the base of her neck while I was examining her throat latch for the cause of a wheezing sound; a pounding motion was distinctly felt, whereupon the heart was examined for several minutes, during which it was noted that the pulse varied from 68 to 78 per minute. The intensity of the beat continued. Outline of the heart was clearly outlined as high as the middle of the chest wall, and as far back as the ninth rib. Impact against the chest wall distinctly felt over an area as large as the hand. The pounding felt against my thigh before mentioned was due to a distinct jugular pulse showing plainly to the posterior border of the maxilla. Auscultation revealed the pulse very plainly over the region of the left kidney; it was distinctly felt in the peripheral arteries out to and including the plantars; pulse cause the raising of the ears at times. Further examination postponed until all exciting conditions should be absent.

8.30 p. m. Animal seems somewhat more depressed than before. Was lying quietly upon left side. Pulse, 68; respiration, 22; temperature, 101° F. Did not arise until spoken to repeatedly and urged, when she arose awkwardly, weaved perceptibly for several minutes, finally steadied herself, with head down and eyes partly closed. Pulse, 74; respiration, 22. Auscultation with phonendoscope revealed no hissing sounds in the region of the heart, but the first heart sound enormously increased; second heart sound smaller than normal, and occasionally could scarcely be distinguished. Pulsation at the heart was attended by corresponding pulsation of the jugular vein, followed almost immediately by the carotid pulse. Auscultation over the rumen revealed motion in that organ at intervals of about one and a-half

minutes, no gas present, and food seemingly in normal condition as regards moisture content. Careful auscultation over right flank failed to reveal any intestinal movement whatever. No tenderness in any part of the body.

During the course of the examination, which covered a period of three quarters of an hour, there were two periods lasting about two minutes each, in which there was some harshness of the breathing, with slight acceleration. The cause for this was found upon examination of the region of the pharynx and larynx, to be a slight edema. No other edema was present upon the surface except a small area in front of the udder.

Her milk flow was reported as having fallen off from 36 pounds to 22 pounds in the last forty-eight hours, this being the final reduction from a maximum of 48 pounds when she freshened, and which had been falling off gradually during the past week. No medication was prescribed that night, but orders left to watch for any radical change in condition of breathing or circulation, or other untoward symptoms.

Monday, 9th. Animal slightly brighter. Had eaten a few handfuls of grass, drank a pail of water, and nibbled a little of the morning feed of hay. Stood with flanks greatly depressed, rumen moving very slowly and without force, at intervals of one and one-half minutes, and a very slight amount of gas present. Heart action practically as observed on previous day. Animal urinated while examination was being made, and exertion accompanying the same caused a fluctuation of the pulse from 68 to 72; defecation followed closely, attended by a further rise in the pulse rate of 8, making 80, unaccompanied by any change in respiratory effort. Respiration was in the neighborhood of 22 to 24, with an occasional long drawn sigh followed by several panting motions before return to normal. Animal allowed the liberty of a small lot, but given no exercise except a short walk during the examination. Advised tempting the appetite with any morsels at hand, leave water at her disposal, avoiding all exciting conditions in her neighborhood as far as possible, and directed that two pounds Glauber's or Epsom salts be given in three

doses during the day, being very careful that she was not unnecessarily excited during the administration of the drenches. She was to be kept warmly blanketed and comfortably, though not deeply, bedded.

The kicking motion of the hind legs was attributed to a tingling sensation due to alterations in the circulation. This seemed to be verified by the fact that this symptom was more pronounced after rising. Diagnosis: Hypertrophy of the heart with dilatation, complicated by atony of the digestive tract. Sinuses examined for the purpose of ascertaining if there was any local reason for her resting her head upon objects, but these were found clear, pink and healthy, with only a little tender spot along the border of one horn core.

This animal had been receiving maximum doses of carbolic acid in feed (she being a large animal) as treatment for contagious abortion. This substance was given credit for the depressed condition of the rumen and digestive organs, consequently for the lack of appetite. In addition there was grave possibility of its having decreased the vascular tone especially of the abdominal region, which, together with the inflamed condition of the kidneys would prove amply sufficient to cause the hypertrophy of the heart. Her parturition though an easy one (the calf weighing but 80 pounds) must have had a great deal to do with the development of the existing condition of the cow, to which must be added the excitement and exertion undergone at the time of the dehorning operation.

(Sample of urine taken evening of the 9th showed upon analysis Tuesday a. m. 10th by Dr. Jodidi of the Experiment Station, to contain but a very small amount of phenol, but more than could be expected under normal conditions.)

May 10th, 11th and 12th, no apparent change in condition, except slight fluctuation in appetite for water and apparent increase in desire for bran and corn meal mashes, occasional mouthfuls of hay being taken. Green food was occasionally eaten, but it was largely thrown out of the manger. Rumen remained very torpid.

Friday, 14th. Pulse down to 62, still hard and bounding. No medication advised unless decided change for worse appeared. She drank two pails at morning feed, and seemed thankful for them, and ate about half a mash of corn meal and bran. Kicking motion of the hind legs has largely disappeared during the past few days, but may show occasionally upon rising from a long rest.

Sunday, 16th. Pulse, 64; respiration, 22; temperature, 100.8° F. Rumen seemed more active and animal seemed brighter; ate allowance of about one-half ration of bran and hay. At 6 p. m. considerably depression was reported. Found pulse 70, respiration, 24; temperature, 100.5° F. Bounding action of the heart was noticeably decreased, and the pulse seemed more nearly normal. Femoral pulse, which had been very prominent, was indistinct; limbs for the first time during the attack were cool. Issued Rx. 141 containing digitalis and alcohol, to be given three times daily until further notice.

Monday, 17th. Pulse, 68, and found to be strong; respiration, 20. Slight rations were given, and eaten well, four times during the day. Gave orders about blanketing as the weather was particularly chilly. She was allowed the run of a small lot as usually.

Saturday, 22d. During the week a very gradual though slight improvement could be noted. The use of digitalis was left off Wednesday, and was not subsequently resumed, as the pulse did not offer to go above 66 to 68, but retained a marked pounding character. Upon this date the horn began to show some irritation, and slight exuberant granulation. This was dried and dusting powder containing copper sulphate was used which seemed to take care of the morbid secretion satisfactorily.

Saturday, 29th. During the week ending with this date she was staked out upon grass and alfalfa pasture, but was not allowed to take much exercise, except in going to and from pasture, a distance of perhaps 50 yards. This seemed to have a very favorable effect upon the tone of the body and rumen, and the heart's action maintained its strength with a gradual decrease

in frequency. Pulse, 62; respiration, 17; temperature, 100.5° F., after having walked from her stall to the tethering place. Suppuration being apparent at the base of the horn, she was led slowly to the veterinary building, placed in stocks and the wounds carefully cleansed. Examination revealed the presence of small splinters of bones at the base of the horn on both sides. These had become carious and were carefully removed. It was then found that the bones concurring in forming the base of the horn had partaken of the carious process and curettement was necessary to cleanse the area. This occasioned much pain and excitement, but she stood the operation well, showing pulse of 74, respiration, 24; temperature, 101, after which she was watered and led back to pasture.

June 7th. When examined on this date, she showed much improvement in tone, appetite and apparent strength. Horns showed slight suppuration, and very small amount of exuberant granulation. This was carefully removed, dried with iodine in ether, dusted with compound alum powder, and returned to the pasture.

June 11th. Doing very well. Pulse, 60; respiration, 16; no sound of pulse perceptible over the region of the kidney; jugular pulse still present, but indistinct. Action of the heart nearly normal; action of the rumen normal; milk flow nearly normal, having again reached 44 pounds or over per day. Horns will probably make an uneventful recovery. Right horn sinus completely scabbed over and left all except a small point which was curetted and dried with iodine in ether and dusted with comp. alum. powder.

This case is of interest from several standpoints. First, she has proven a very valuable case in connection with the study of the toxic action of carbolic acid when administered internally. This substance has undoubtedly had much to do with the cause as well as the course of the disease.

Second, her case was extremely interesting for study in connection with the heart lesion from which she suffered and has

apparently recovered. The observations collected are of value in connection with that disease.

Third, and finally, she is a living demonstration of the value of constitution. Such a concomitant occurrence of symptoms would have been but poorly borne by an animal of weak constitution, if at all, and especially during the period while the rumen was so depressed. The combination of conditions has been a rather rare one, and it is altogether due to her great physical strength and endurance that treatment of her case has been attended by any gratifying results.

I am led to conclude from a careful study of these cases that there is a physiological principle involved which would tend to make it almost impossible for this class of disorder to occur in other than ruminant animals. I believe that a close examination of these cases both ante and post mortem could only lead to the conclusion that the primary effect of the carbolic acid has been exerted upon the walls of the rumen, and upon its contents. While absorption does not occur actively through the walls of the rumen, *i. e.*, it is not accomplished by virtue of the activity of any specialized cells or structures, yet anesthesia of the walls of the structure is undoubtedly produced in spite of its thick epithelial covering. This results in the partial or complete cessation of movement of this organ, depending upon the amount of surface that has been anæsthetized before dilution of the acid occurs by uniting with the food substances. The action of phenol as a local anæsthetic is generally recognized, and it has been abundantly proven that its action is exerted very accurately when it is applied to the unbroken surfaces of the body, whether they be mucous or cutaneous. Winslow in his work upon the Therapeutics of Domestic Animals, speaks of carbolic acid as having a marked anæsthetic action upon the sensory nerve endings of the stomach where under normal conditions it is combined with sulphates before being absorbed into the circulation.

The fact that phenol was found in the rumen eleven days after its last administration seems to me to prove the cause as above stated. Had the phenol been found only in the urine at

this late period, it would be necessary to consider other organs as being instrumental in retaining the poison, but they failed to show structural or functional change so far as I was privileged to examine effect on contents of rumen. The presence within the rumen of the dose usually given of carbolic acid, would not materially affect the fermentation naturally progressing in that viscus due to the action of organized ferments (bacteria), and the unorganized ferments contained in many of the food stuffs. The amount which might accumulate in from five, eight or ten days must undoubtedly have some such action. One of the most important actions of this drug in this connection is its well-known destructive activity towards the lower forms of life, being active as an antiseptic in some degree, in all its strengths. This assumption is also justified by the fact that in only one of the four cases observed did fermentation occur, and then only during the first thirty-six hours of its course, and in this case also after evacuation of the gas by use of the cannula. Among the remainder no gas formation was discernible by careful auscultation. The state of the food in the animal which died showed very plainly that no disintegration either by motion in the rumen or by fermentative changes, had occurred within several days if at all since the first serious symptoms.

That portion of the phenol which slowly escapes from the semi-paralytic rumen and reaches the third and fourth stomachs and intestine, while tending to check the action of the digestive fluids upon the foods contained, probably accomplishes its chief activity after absorption, in depressing the nervous and vaso-motor supply of this region. Absorption is, of course, rapid during the early stages of its passage through the body, and for that reason it is not likely that the amount, constitution or consistency of the feces is affected unless prolonged in action by continued exhibition, or by giving in very large amounts.

CONCLUSION.

We have then in this series of cases a form of carbolic acid poisoning which differs very materially from that usually de-

scribed, including a set of symptoms which might very readily be confused with more common and less serious ailments. A few of the more characteristic symptoms only were common to the whole group; first, the depressed condition of the rumen; second, general depression of the sensorium; third, some degree of cerebral disturbance; fourth, moderate advance in pulse rate and temperature; respiration likely to be out of proportion with heart action, the latter being affected by the decreased blood pressure resulting from marked depression of the vaso-motor nervous system, possibly to a serious extent; all these and others mentioned might be expected in mycotic poisoning, impaction and several other forms of dietary disturbance. As said in the introduction, however, there is something very suggestive about these cases, and under conditions where such treatment is likely to be in use (Abortion trt. with C. A.), it is well to ascertain the amounts used and the length of time over which it has extended, also when last given. The darkening effect upon the urine was noted in a few instances, the odor did not become sufficiently marked as to be noticeable at any time, but it is altogether likely that the odor which caused the remark of the stable man before referred to, was due to the presence of the phenol in the feces. The test for its presence in the urine in any suspected cases will be conclusive and is easily conducted, requiring only a few test tubes and the proper chemicals. The instance cited shows this point very favorably and especially so since the test samples taken from three apparently normal cows did not reveal the presence of C. A. at all.

(In conclusion, I believe that it is not out of place to say that the close confinement of the cattle may have had something to do with the development of these cases. They occurred at the season of the year when from high feeding and slight exercise, the constitution and tone of the dairy animal is likely to be at low tone, viz., March, April and May.)

BOVINE TUBERCULOSIS IN IOWA HERDS.*

By H. E. TALBOT, DES MOINES, IA.

There is scarcely a subject relating to the lower animal which has so great a bearing upon the public health, and which has occasioned so much thought, personal research, both friendly and bitter discussion, and above all, such an earnest effort toward its control, as bovine tuberculosis.

While it is one of the oldest and most dangerous diseases among cattle, there is still such a diversity of opinion among both the profession and the stock breeders, that we find it a very difficult problem to accomplish the best results with the limited means at our disposal.

There are a great many who believe that a large amount of tuberculosis exists among our cattle and swine, while others think that just the opposite is the case, so it is very important that we as veterinarians arm ourselves with all the facts at our command to be better able to thoroughly enlighten our clients upon this subject, thereby gaining not only their respect, but their hearty co-operation in our flight to stamp out and control the ravages of this disease in the lower animals of Iowa.

The cause of tuberculosis is so well known to you all, that it will be unnecessary to dwell upon that point. Practically all are agreed that it is a micro-organism, "The Tubercular Bacilli," but there seems to be some difference of opinion as to the method of infection; a large number holding that the great source of infection is through inhalation or through skin wounds or abrasions.

We believe this mode of infection is possible, but not common, the greater percentage of animals becoming infected through the digestive tract.

* Iowa Veterinary Association.

Experiments have proven that milk from a tubercular udder fed to calves has produced the disease in from one to ninety days. We also find that in Iowa the largest percentage of tubercular swine come from districts where the cattle are diseased, the infection coming through the faeces, milk or dead carcasses, as for example: A case came under our observation this summer where a cow had died from tuberculosis. The carcass was drawn into the swine pen and opened, giving the swine free access to the internal organs. The drove of swine were seventy-two in number, and were sold in about ninety days to a packing house where federal inspection was maintained. Upon being slaughtered every animal showed marked tubercular lesions and twenty-two were consigned to the tank.

Animals very rarely become diseased without coming in contact with infected ones or by eating and drinking from the same boxes or troughs. It has also been demonstrated that tubercular mothers very rarely give birth to tubercular offspring. Almost every example proves conclusively that the greatest method of infection is through the digestive tract.

While we have numerous bulletins and a world of literature at our command which places us in possession of the facts as they exist, to the end that we might still have a more abundant proof, I have compiled the results of a number of tests made by us in Iowa during the last year.

I feel that these tests will be of interest to you, not only in your effort to determine the percentage of tuberculosis as it exists in Iowa, but also to prove the reliability of the tuberculin test, as upon this test hinges the great difference of opinion; not among the members of the profession, but with the laity and the stock raisers. These opinions are many times offered through selfish motives, but many are conscientious, believing that tuberculin will produce the disease in a healthy animal, or that animals will respond to the test when suffering from other diseases or injuries. Many also believe that healthy animals will respond to the test, thereby causing great destruction of the herds through the unreliability of tuberculin.

It has been to overcome these numerous misconceptions that this report has been compiled and while these tests have extended over a number of months and have been made in various localities throughout the state, we have always exercised great care in recording them, to the end that the grand total might be an absolutely reliable report of the results obtained through the use of tuberculin during the past year.

I have taken as the foundation or unit for the purpose of this report one thousand (1,000) cattle. Among these were two three-year-old bulls, one pure-bred Short Horn and one pure-bred Holstein, both of which reacted to the test and both of which showed the disease on post mortem; the Short Horn being consigned to the tank. There were also about one-half dozen calves from six to nine months old, and from twenty to thirty steers ranging from one to two years of age, but the majority of the number was "she stuff," particularly milk cows, there being a few heifers in the bunch.

To the end that this report may be unquestionable, I have used the owner's name, address and the date of test, which is as follows:

The number tested was one thousand (1,000), the number reacting being three hundred and six (306) or thirty and three-fifths per cent. of the number tested. In explanation of the large percentage of reactors it must be remembered that sixty-one per cent. of the entire number were from suspected herds, this percentage being far in excess of the percentage of diseased animals throughout the state.

Of the three hundred and six reactors, all were slaughtered at packing establishments where federal inspection is maintained, the animals being turned over to the federal inspectors for final diagnosis and disposition.

While we witnessed the post mortem of all of these animals ourselves, we have taken their final examinations for the purpose of this report. According to the report furnished us by the United States inspectors, of the three hundred and six slaughtered, three hundred and five showed marked tubercular lesions,

proving this test to be ninety-nine and nine-tenths per cent. reliable. This showing proves the almost absolute reliability of the tuberculin test.

Of the 306 slaughtered, 76 were consigned to the tank as unfit for food, being $7\frac{3}{5}$ per cent. of the entire number tested, or $21\frac{1}{2}$ per cent. of the reactors.

This, gentlemen, is of great importance to the practitioner, as it is one of the first questions the client asks the veterinarian after he has been convinced as to the reliability of the tuberculin test. The question usually is, "If my cattle do react, what am I going to get for them?"

More especially is it advisable for us to bear in mind this percentage which goes for offal in a state like Iowa, as there has never been a dollar appropriated by our legislatures to reimburse the owners for tubercular cattle which passes for food, and in this way we are able to show the owner that he can reasonably expect to receive about 75 per cent. of the value of his cattle by shipping and having them slaughtered at packing houses, where federal inspection is maintained. This percentage which goes for offal is a conservative one upon which to base estimates to your patrons.

I am also reliably informed by the chiefs of the several packing plants in Iowa that about 75 per cent. of all tubercular animals slaughtered at the abattoirs passed for food.

Therefore after the public has been convinced as to the reliability of the tuberculin test, the next and most important step is to be able to give them reasonable assurance that their loss will not exceed 25 per cent. This estimate of course is based upon beef value, not high priced pure bred or valuable milkers.

Of the 306 reactors slaughtered, 203 passed for food, being 29 per cent. of the number tested and $78\frac{1}{2}$ per cent. of the number slaughtered. Of the 1,000 tested, 610 were suspected cattle. What I mean by "suspected cattle" is where the disease is known to have existed on the premises.

We are able to trace a great deal of tuberculosis through reports from federal inspectors, these reports being furnished them

by the packers. The state veterinarian is then notified and upon visiting the premises and making the test we almost invariably find the stock diseased. It is these herds which are reported as "suspected," so a summary of this test would be as follows:

Number tested, 1,000; number reactors, 306, or $30\frac{3}{5}$ per cent.; number slaughtered, 306, or $30\frac{3}{5}$ per cent.; number showing tuberculosis on post mortem, 305, or $99\frac{9}{10}$ per cent. of the number slaughtered; number tanked, 76, or $21\frac{1}{2}$ per cent. of those killed; number passing for food, 230, or $78\frac{1}{2}$ per cent. of the number killed; number suspected, 610, or 610 per cent. of the number tested.

It must be borne in mind that this is not necessarily an indication of the prevalence of tuberculosis in Iowa herds, for in non-suspected herds the percentage would be considerably lower.

While this report of 1,000 animals comprises but approximately one-half of the number tested by us during 1908, this number has been sufficient to establish beyond any question of doubt the reliability of tuberculin.

I will say, however, that these cattle have all been tested with fresh government tuberculin.

While tuberculin of other makes may be just as reliable, never having used any other, I am unable to report as to its reliability.

While V. A. Moore, of Cornell University, Ithaca, N. Y., maintains there is no standard or uniformity in the preparation of tuberculin, I firmly believe that if the test is properly applied, taking into consideration the excitement of the animal, watering or feeding just prior to taking temperatures, advanced pregnancy, retained placentas, abnormal temperatures before injecting the tuberculin, etc., and that if fresh government tuberculin is used, the failures will not exceed one per cent.

According to V. A. Moore, a committee has been appointed from the laboratory section of The American Public Health Association for the purpose of formulating a standard method for the preparation of tuberculin. This committee is now at work, but has not as yet reported.

We have applied the tuberculin test to cattle suffering with actinomycosis for the purpose of determining whether a reaction could be obtained. The results were negative and upon post mortem the animals have proven to be free from tuberculosis.

We have also experimented with tuberculin upon animals known to be tubercular, for the purpose of determining how often cattle would react to the test. I will give one experiment, using the owner's name by his permission.

W. F. Parks, Indianola, Iowa. Dates, Feb. 5th and 6th, 1908. Number tested, 25, all being pure-bred Short Horns, number reacting, 13. Of this number 6 were immediately slaughtered the remaining 7 being allowed to remain on the premises for the purpose of saving their calves, they all being with calf. I am unable to give the exact dates of the subsequent tests, but can give them very closely. In about 90 days (May 1st) these 7 cows were retested, only 5 reacting, no attention whatever being paid to advanced pregnancy, the majority of them having calved. One animal, however, which was due to calf in about 10 days failed to react.

About sixty days later (July 1st) they were tested for the third time, at that time all having calved, when four of the seven failed to react.

About four months later (November 1st) they were tested for the fourth time, five reacting, but during these four tests there were two which failed to react after the first test.

On November 14th the seven cows were slaughtered at the Agar Packing plant in Des Moines, Iowa, and all showed advanced tuberculosis, two of the seven belong consigned to the tank.

On November 11th and 12th, the seven calves from these seven cows were all tested, together with twenty more young cattle. All seven calves were non-reactors, these calves immediately after birth having been placed with healthy mothers, which had previously passed the test.

We have conducted numerous other experiments during the past season similar to the one just reported, and these experi-

ments have taught me that if ever an animal gives a positive reaction, not to try to deceive myself or to make myself believe this reaction may have been caused by some other disease than tuberculosis. I have, therefore, refused to make second tests, for by so doing I am convinced that we would often leave a number of diseased animals upon a farm, the stock-raiser therefore being very slightly benefited and his herd still subject to danger of infection from the diseased animals which failed to respond to the second test.

I believe it to be our duty as veterinarians to so notify the owner and to endeavor if possible to convince him that a subsequent test would be worse than folly, for in every instance where a second test is conducted after a positive reaction has been obtained, to a limited degree it is an admission that we ourselves are not absolutely sure as to the reliability of the tuberculin test. Our interpretation of a typical tuberculin reaction should be to diagnose it as tuberculosis without any hesitancy. It does not necessarily follow that all re-acting animals are worthless, but they should be isolated from the rest of the herd, for the reaction may take place when the lesions are very small, in fact too small to be seen. It is possible that where animals react and no evidence of the disease is found in the internal organs, or the lymphatic glands, that a more careful examination of the bones, joints or nervous system might reveal the presence of tuberculosis. As for example: A few weeks ago a three-year-old steer was slaughtered at an abattoir where United States inspection was maintained. A careful examination of the viscera was made and no tuberculosis found. An examination was then made of the spinal cord, where lesions were found, small tubercles being situated on the spinal cord in the lumber region. Our attention had been directed to the spinal column from the fact that the animal had a staggering and wobbling gait and upon pressure or a slight blow to the affected region, the animal would fall to the ground prostrated and had to be assisted before being able to rise.

However, I do believe repeated tests to be of vital importance to the non-reacting animals at any time from six to twelve months, as tuberculin will not always give a reaction during the period of incubation or where the disease has been arrested. The same is also true of advanced stages of the disease, so that the records of tested herds do not always point out all of the infected ones, as the ones recently infected or those in the advanced stages may not react until the disease becomes active. In order to eliminate the disease entirely from a herd, repeated tests are necessary.

Where tuberculosis has been known to reappear in a herd, after the reactors have been slaughtered, both the owner and the public are prone to place the blame upon the veterinarian or to question the reliability of the test; when in fact the owner himself is to blame for his failure to have them retested. It is therefore quite important that the owner be advised by his veterinarian as to the necessity of subsequent testing, thereby relieving himself of the responsibility should the disease recur.

Cattle reacting to the tuberculin test should be disposed of in the following manners: (1) Total destruction. (2) Slaughtered at abattoirs under proper inspection. (3) Isolated for breeding purposes according to the Bang method.

The veterinarian should in all cases keep a record of the animals tested, date of testing, owner's name, number reacting, and the disposition of all reactors if possible. The latter, I am aware, is sometimes impossible, or at least that has been our experience during the past season. However, we are able to say positively that there has been but one herd which has escaped us, and upon which we are unable to give the post-mortem results.

Of several thousand animals which have been tested during the past season there was no herd in which so great an amount of interest was taken as in the case of the herd referred to above. There were several reasons for this unusual interest, the first and greatest reason being that it was the most beautiful, typical dairy herd of Holsteins that it has ever been our pleasure to have tested. The cattle were owned by the state of Iowa and

were at one of the state institutions. There were 106 in all, practically all Holsteins, and of all ages. They were tested April 21st and 22d, 1908. Of this number there were 57 reactors, almost 54 per cent., and this was not considered a suspected herd.

It is a great disappointment indeed not to be able to report the post-mortem results of this particular herd, but no blame whatever can be attached to the State Veterinary Department for its failure to witness the post mortem, the parties in charge of these cattle having seen fit to dispose of them without notifying the department, after having been previously advised that it was the desire of the department to witness the post mortem on every animal which reacted. They were also advised that the federal laws prohibited the interstate shipment of diseased cattle.

I was personally notified sometime after the disposition of these cattle that they had been shipped to Omaha for slaughter, but I was not furnished with the results of the post mortem, although I made that request.

I refer to this particular discourteous incident as a warning to veterinarians that in cases where animals have reacted, the proper official should be notified in time to place a quarantine upon them. This action would insure the proper disposition of these animals, would be a safeguard to public health and would win for the veterinarian the lasting gratitude of those who are to-day waging an almost hopeless fight against this great white plague.

In conclusion let me urge upon those present that they be untiring in their efforts toward the upbuilding of our profession, remembering that as the public now looks to us for protection from this awful scourge, so may we as veterinarians never betray the trust which they have imposed, but with that disregard of self which is the only true indication of character, let us ever be found among the leaders of the fight, scorning the criticisms of the envious and looking for our reward only in the consciousness of duty well done.

BOVINE TUBERCULOSIS IN IOWA HERDS.

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Owner.	Address.	Date.	No. Test.	No. React.	No. Slaughtered	No. Show.	No. P.M.	No. Tanke.	No. Passed.	No. Susp'd.
W. F. Parks.....	Indianola	Feb. 5, 6.....	25	13	13	3	10	..	..	..
F. Brown.....	Indianola	Jan. 2, 3.....	28	6	6	5	1	5	..	..
State of Iowa.....	Mitchellville	Mar. 4, 5.....	30	10	10	3	3	3	3	30
C. W. Stuart.....	Olive	Mar. 9, 10.....	97	3	3	1	1	12	7	30
State of Iowa.....	Clarinda	Mar. 12, 13.....	42	1	1	1	1	1	3	42
F. Brown.....	Indianola	Mar. 18, 19.....	30	18	18	18	6	..	..	30
T. Hargis.....	Des Moines.....	Mar. 21, 22.....	2	..	..	..	..	..	..	..
D. R. Brewer.....	Des Moines.....	Mar. 27, 28.....	14	..	..	..	..	..	..	..
N. E. Coffin.....	Des Moines.....	Apr. 16, 17.....	9	..	..	..	..	..	..	..
J. Atkinson.....	Des Moines.....	May 4, 5.....	13	..	..	..	..	..	..	..
J. Porter.....	Altoona	May 4, 5.....	4	..	..	..	..	..	..	..
C. Wilson.....	Waukee	May 22, 23.....	9	..	..	..	..	..	..	..
H. Polk.....	Des Moines.....	May 25, 26.....	176	129	129	40	40	89	1	176
L. Samson.....	Altoona	May 27, 28.....	3	1	1	1	1	..	..	3
M. Lewis.....	Ankeny	June 10, 11.....	13	..	..	..	..	..	..	..
H. Thornton.....	Ankeny	June 17, 18.....	22	10	10	10	2	8	1	22
V. Donelson.....	Ord...	July 6, 7.....	12	1	1	1	1	..	..	12
N. J. Harvey.....	Ankeny	July 7, 8.....	176	129	129	40	40	89	1	176
State of Iowa.....	Independence	July 21, 22.....	31	1	1	1	1	..	..	..
State of Iowa.....	Council Bluffs.....	June 24, 25.....	63	..	..	..	..	..	..	..
State of Iowa.....	Eldora	July 30, 31.....	3	..	..	..	..	..	..	..
D. L. Berry.....	Indianola	Sept. 1, 2.....	15	..	..	..	..	..	..	..
State of Iowa.....	Knoxville	Sept. 3, 4.....	13	..	..	..	..	..	..	..
G. Farrell.....	Ankeny	Sept. 21, 22.....	8	..	..	..	..	..	..	..
Wm. Kooms.....	Des Moines.....	Sept. 25, 26.....	4	..	..	..	..	..	..	..
T. Speed.....	Pleasantville	Sept. 28, 29.....	32	25	25	25	3	22	32	..
W. Wilcox.....	Marshalltown	Oct. 2, 3.....	195	73	73	1	1	..	59	195
State of Iowa.....	Mt. Pleasant	Nov. 5, 6.....	25	..	..	..	..	..	1	25
D. L. Berry.....	Indianola	Nov. 24, 25.....	16	..	..	..	..	..	..	..
H. Dorman.....	Madrid	Dec. 8, 9.....	27	..	..	..	..	..	..	27
W. F. Parks.....	Indianola	Dec. 11, 12.....	6	..	..	..	..	..	..	..
Wm. Deter.....	Avoca	Dec. 22, 23.....	1,000	306	306	305	76	230	610	..

A CONTRIBUTION TO BEHRING'S BOVOVACCINATION.*

BY W. EBELING, TRANSLATED BY DR. WILFRED LELLMANN, V.S., NEW YORK CITY.

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Our knowledge of the nature of tuberculosis, especially of its pathogenesis, has been materially enriched by the valuable pioneer-work of von Behring, covering a period of years. He realized that the cardinal source of this disease is infantile infection occurring in most cases during the first days of life. The infection appears to be mostly alimentary, the tuberculosis virus being conveyed in the food, and especially in the milk infected with tubercle bacilli, into the alimentary canal, and hence, because of the protoplasmatic nature of the intestinal membrane which in the first days of life partly lacks the protective layer of epithelium, to the lymph ducts, whence it may find its way, either through the lymph or through the blood, into all the organs of the animal-body, causing tubercular lesions. The source of the tuberculosis virus is not limited to the milk-gland of the mother or wet-nurse, but the bacilli may get into the milk before it is fed to the young individual, or they may be washed down with milk originally free from tuberculosis from parts of the mouth infected with tuberculosis poison by contact or inhaled with the air. This view, when it was first published and up to the present time, has met with violent opposition based particularly on the claim that especially in tuberculous changes of the lungs it has been proven clinically and by post-mortem examinations in human beings, as well as in bovines, that the air inhaled into the lungs must be considered the carriers of the infection-material, and that tuberculosis of the lungs must be designated as the primary form of the disease. This interpreta-

*Reprint from *Med. Krit. Blatter*, Vol. I.

tion was further supported by the doctrine of the predisposition of single individuals to tuberculosis, who, tainted from birth, are liable to have acquired a certain degree of susceptibility to tuberculosis which would cause them, if in unfavorable hygienic surroundings, or consequent upon physical excess, to succumb to this disease. In contrast to these views, Behring considers the various tuberculous affections in later life, especially the tissue destruction characteristic of human pulmonary tuberculosis, as the result of extensive and long-enduring changes in the organism caused by infection at infant age. The tubercle bacilli taken up at this age, and believed to remain latent in the organism, from which condition they are aroused under the influence of later occurring, mostly acute, so-called accidental diseases, are supposed to acquire the ability of causing general infection or auto-infection.

The careful observer finds this doctrine of the infantile alimentary infection substantiated in numerous instances in veterinary practice; so that this form of infection as the cause of tuberculosis dissemination among the farm animals, especially cattle and swine, must be designated as the most important under present agricultural conditions.

In former times, when agriculture was practised more extensively, the farm animals, especially cattle and swine, had at their disposal large pastures every year, in which, during the summer months, they were allowed to lead natural and therefore healthful ways of life. During the warmer seasons, these animals were kept in the open air continuously and were stabled only during the winter months, to be fed healthful home products. Besides, the but small crop of grain and beets did not permit the keeping of a large number of animals, because their maintenance would have been difficult, and for this reason, there was but limited opportunity to contract tuberculosis by contact infection even during the stabling period, and it is not astonishing that in former times tuberculosis occurred only sporadically in a herd.

These conditions underwent a change when the more intense practice of agriculture was begun. Because of the greater areas

used for grain and vegetable cultivation, the pastures were cut down and the animals kept on them, but for a short time during the year; but in most cases they were stabled all the year through. They were over-nourished with artificial feeds, in order to yield a larger amount of milk or meat. They were considered mere milk and manure machines whose health was often disregarded, and the natural consequence was a weakening of their constitution, because this over-production was obtained while the animals were constantly kept in the stable, and, in most cases, under poor hygienic conditions. Besides, with the increase of trade in general, the trade in cattle especially grew larger, and with the import of foreign breed animals, tuberculosis was frequently introduced into previously healthy herds. But in spite of these disadvantages, with the timely realization of the danger the further dissemination of tuberculosis among the farm animals could have been limited, if it had not been for the circumstance which must be considered the main cause of tuberculosis dissemination, viz., the establishment of dairy depots. In former times, the milk supply of the separate farms was disposed of by them independently, and the excess was fed to the farm animals. In most cases, no danger was connected with this mode of procedure. Since the dairy depots came into existence, the entire milk from a certain agricultural district is brought together and mixed before it is disposed of, and the excess of this mixture is returned to the members of the combination. Now, tuberculosis of the udder in milch-cows is one of the main factors in the dissemination of the disease; on the one hand, because this form of tuberculosis is not easily detected by the owner or milker, and the change that has taken place in the milk of such cows is not perceptible to the layman. On the other hand, because with this form of tuberculosis and the enormous production of tubercle bacilli, the infecting material gets into the milk and at the dairy depot will infect the entire supply, especially the skim-milk. Through the feeding of such skim-milk to young stock, especially calves and pigs, as is customary, artificial dissemination of tuber-

culosis was unwittingly caused on an enormous scale, especially wherever the skim-milk was fed unsterilized.

There is no more fitting proof for this fact than the increase of tuberculosis among the pigs of large dairy concerns, where for the utilization of the excessive milk large numbers of pigs are kept. In such places the increase of tuberculosis is making rapid headway, and small wonder, if we consider that according to statistics, one case of udder tuberculosis is to be found, in the larger herds, in every hundred milch-cows. A dairy that at an average disposes of the milk of about 1,000 milch-cows daily, therefore receives milk from at least 10 cows with udder tuberculosis, a quantity sufficient to thoroughly infect the entire milk, and therefore to increase the dissemination of tuberculosis among the young stock, in the form of feeding tuberculosis. Another proof that the dairy depots are the main source of infection, is the fact that according to the findings of the meat inspectors at the larger slaughtering places in Prussia, the number of animals condemned as tuberculous have increased materially since the last two decades of the past century, the time within which the establishment of the greater number of dairy depots occurred. While according to the examinations of the Imperial Board of Health during the years 1888-1892, 8 per cent. of all bovines in the German Empire were found to be tuberculous, the results of examinations at the large abattoirs of Prussia in the year 1895 already showed 15 per cent.; in 1896, 14 per cent.; in 1897, 15.8 per cent.; in 1900, 17 per cent. of all slaughtered cattle tuberculous; and according to the results of the law on beef-cattle and meat-inspection in the German Empire, there were found in the year 1906, 23.5 per cent. of all beef-cattle tubercularly infected.

This fact compelled those in authority to look for means for the elimination of this calamity. Therefore the methods of Bang and Ostertag were resorted to, the latter of which has so far found the greater number of supporters and offers the best prospects of success. But the very fact discussed just now at the same time serves as proof of the correctness of the views ad-

vanced by von Behring in his writings on the cause of tuberculosis, viz., that the milk fed to the young individuals must be considered the main source of tuberculous diseases. For without the opportunity of an infantile infection by way of the alimentary canal, with infected skim-milk, obtained from dairy depots, the dissemination of tuberculosis among the farm animals would not have gained the extent within the short period of two decades, as has indeed been the case.

The whole world was interested, when the discoverer of diphtheria antitoxin and of the sero-therapeutic method in his lecture at Stockholm in 1901 stated his intention to shortly make known a method for the suppression of bovine tuberculosis on basis of his phthisiogenetic researches, by which it would be possible to artificially immunize cattle against tuberculosis infection. As is well known, this method, analogous to Jenner's smallpox vaccination, consists in the artificial injection of attenuated tubercle bacilli of human origin into the circulation of cattle, for the purpose of isopathic immunization, and was named "Bovovaccination" by von Behring.

According to this method I have vaccinated during the period from March 11, 1903, to March 21, 1908, 4,621 calves of 37 different herds, after I had in the years 1903-1905 thoroughly studied the methods at the Marburg Institute for Experimental Therapy, and also later remained in touch with the directors of this institute for the purpose of exchanging views regarding the experience gained.

A special record was kept for each bovovaccinated animal. The calves were supplied with an earmark bearing a consecutive number and an appropriate mark, so that each animal could be accurately identified even after years. With the exception of three animals that soon after vaccination died of acute lung oedema, the young calves have stood the vaccination well and developed into fine animals, to the great satisfaction of the owners. However, in the beginning of 1908, septic pneumonia was prevalent among the young stock of this region to quite an extent, which, as a matter of course, prohibited the vaccination of the diseased

animals, but which also caused us to be careful with the apparently healthy calves, because in many cases they were suffering from the latent form of pneumonia which, after the injection of tubercle bacilli into the circulation, was converted into the acute form and killed the animals. Therefore, the immunizations were postponed, and, because of the unfavorable results obtained later on in consequence of the epidemiological dissemination of infectious pneumonia, had to be discontinued entirely for the time being.

In spite of this, the experiments prove clearly to-day the value of the bovvaccination. At the inauguration of this method, writers on the subject called attention to the fact that a conclusive opinion regarding it could be expected only after a lapse of years, when the results of the systematic use of the method in a greater number of herds could be submitted for examination. Therefore, my tests cannot be considered a conclusive proof because of the relatively short time elapsed since the introduction of the method—that will perhaps require decades—but they will be of some value as compared with the single experiments in clinical institutions, inasmuch as my experiments were carried on under natural agricultural conditions, and under the observation of the necessary hygienic measures. These sanitary precautions are absolutely required for the correct valuation of bovvaccination, since all artificially produced immunity is but relative and never absolute, as von Behring has repeatedly emphasized in his writings. This immunity can be lost through unhygienic conditions and frequent opportunity for mass-infection with tubercle bacilli, just as in civilized countries, where smallpox epidemics have been routed by the introduction of vaccination, single individuals still contract the disease, as soon as they have been exposed to infection in a large measure. Therefore, it should not be astonishing, if young calves under certain conditions contract tuberculosis in spite of bovvaccination, namely, if they are kept under conditions which exclude even the slightest sanitary precautions and which are conducive to tuberculosis infection. For this reason, I cannot consider successful all those

experiments, in which the young individuals have been intentionally and repeatedly exposed to severe infection by highly virulent tubercle bacilli, because the acquired relative immunity could not withstand this severe infection, and the results of necessity had to be unfavorable.

The opinions of cattle owners whose herds have been systematically immunized by me for a period of six years have been especially valuable to me in drawing a conclusion as to the importance of bovovaccination; because these owners saw the vaccinated animals daily and because of the vaccination paid particular attention to them, and with the records they could determine accurately, whether there was an improvement in the condition of the herd since the adoption of bovovaccination, or not. And I may state here summarily, that all owners, when examining the material from an objective point of view, were convinced that their herds had improved in health since the introduction of the method. The losses by deaths and by inferior returns caused by tuberculosis have obviously decreased, while the material gain has increased considerably. The fact alone, that 37 cattle owners are having their young stock systematically bovovaccinated, must be considered a success for the method, inasmuch as it would never have been adopted so generally in a relatively limited agricultural district, if it did not afford evident and generally acknowledged advantages.

Mr. v. S. in C. recently stated upon my inquiries, that his herd is in so excellent a condition since the adoption of bovovaccination, as never before, and that in recent years he has had no losses from tuberculosis. He attributes this success to bovovaccination and requested its continuation as soon as the septic pneumonia epidemic had run its course.

In the herd of Count v. S. in L., 10 per cent. of the adult cattle succumbed to tuberculosis or had become useless, in former years. The virulence of the tubercle bacilli in this herd was especially high, as von Behring himself had determined by an examination of animals which I had sent him to Marburg. Since the adoption of bovovaccination, the number of diseased animals

decreased visibly, and within the last two years, I have not known of a decided case of tuberculosis there. On the estate G, there reacted in 1903, prior to vaccination, 87 per cent. of the adult cattle, and 100 per cent. of the cattle below two years of age, upon the subcutaneous injection of tuberculin. In 1904, 24 per cent. of the bovovaccinated cattle up to one year of age showed a rise of temperature, and in 1905 only 18 per cent. In 1906, of all animals bovovaccinated up to that time, a total of 216 head, only 21 per cent. showed a fever reaction. Of the animals bovovaccinated by me, 61 head were dissected after having been slaughtered, in most cases purposely, or consequent upon accidents and other diseases. Of these, 58 head were free from tuberculosis, although all lymphatics were examined *lege artis*, and 3 animals were tuberculous. No. 1 had tuberculous nodules in a bronchial and in a mediastinal gland, but was otherwise free from tubercular lesions. Nos. 2 and 3 had come from the herd of the before-mentioned estate L; No. 2 was found to have miliary tuberculosis of the brain with severe symptoms of paralysis *intra vitam*, and No. 3 had tuberculosis of the first vertebra of the neck, disseminated tuberculosis of the lungs and their glands, tuberculosis of the serous membranes, of the liver and of the spleen. These 61 animals, when examined, were from four months to five years of age, and had been vaccinated in the years 1904 to 1909, at a time when in the German Empire the percentage of cattle found to be tuberculous at the meat inspection, was 20 per cent., while in my case only 5 per cent. were found tuberculous. This decrease of tuberculosis in my vaccinated cattle as compared with the state of health of not vaccinated animals in the German Empire, I must attribute especially to the effects of bovovaccination; for there exist no other reasons that could be held to account for these favorable results. These animals, without exception, had come from the herds of large owners, in which, as is known from experience, tuberculosis is more frequent on account of the more numerous opportunities for infection offered by the greater number of animals. In the raising of these cattle, only the absolutely necessary sanitary pre-

cautions had been observed, inasmuch as the young calves had been nursed by their dam up to their sixth week, and later on, besides some prepared food and meadow hay, they had received skim milk which was supposed to have been sterilized before delivery by the dairy, but which according to my observations had not been sterilized, since it turned sour, during the warm season, on account of the imperfect construction of the apparatus. Precautions were taken to avoid contact of the young calves with tuberculosis-suspected, older animals, but up to the completion of their first year, they remained in the same stable with the older milch-cows, to be removed later on, and with the completion of their second year, to be put with the main herd. Under these conditions, they were not wholly protected from the danger of infection, because among the older inhabitants of the stable there were a number of animals that had not been bovovaccinated and which must be considered carriers of tubercle bacilli and no doubt could disseminate tuberculosis virus. But bovovaccination, by developing relative immunity, had produced such a degree of resistance to slighter infections in the vaccinated calves, that they were able to withstand them, on account of the formation of specific anti-bodies.

Only where severe infection occurred, the protective wall of immunity was broken and tuberculous lesions were formed. As belonging to this class, we may safely consider all those animals which on dissection were found tubercular and which had reacted upon the tuberculin test, unless we consider a number of them as having been already infected, either intra-uterine or extra-uterine, prior to the development of artificial immunity.

According to my experiences, von Behring's bovovaccination has fully made good the expectations placed in it. The non-occurrence of a single case of tuberculosis in the bovovaccinated animals, is a demand which, on basis of the described conditions, it is impossible to comply with at the present time, on account of the enormous dissemination of the epidemic and therefore frequent opportunity for infection.

If the most prolific source of infection is closed up, if after the adoption of the new law on animal epidemics, of May 18, 1909, all animals with open tuberculosis are eliminated, then the success of bovvovaccination will be excellent and von Behring's work in this field will receive just approval. I therefore feel justified in agreeing with Much when he states: "Since the possibility, that man can be infected by the bovine, has been proved, a rational method of suppressing bovine tuberculosis constitutes an important weapon in the battle against human tuberculosis, and therefore the discovery of this protective vaccination, whatever may be the general opinion of its results just at the present time, must be considered a great achievement."

How we are justified to view these results on the basis of extensive experiments, I have in the foregoing tried to demonstrate.

THE CAPSULE FOR SHY BREEDERS.—There is considerable interest in the discussion that is going on in breeding circles relative to the capsule and its efficacy in breeding mares that are doubtful. Three years ago we purchased Winnie Colbert, a beautifully bred mare whose dam is Minnie Colbert, expressly for a brood mare. We bred her continuously all of that season to an extra good horse, but failed to get her in foal. The next year we bred her through the entire season to Mr. Grattan's Lodaller. Lodaller is one of the surest horses in the country and with Mr. Grattan's well-known ability to handle both mare and horse we felt sure of success. But again we were disappointed and offered the mare for sale.

Mr. Grattan advised me to try her again, offering to put his time and horse against my time and the mare. I accordingly bred her once last year. Mr. Grattan followed the service immediately with the capsule. The mare never came in season again, never took the horse again, and I have a fine colt, an exact picture of Lodaller. I have unlimited faith in the use of the capsule. When we take into consideration its simplicity it seems the proper thing to use. Besides it saves the owner a lot of extra time and bother, and the mare a lot of extra worry.—J. C. Mills, Fillmore, Minn., in *Breeder's Gazette*.

DIAGNOSIS OF RABIES.*

BY WARD GILTNER, D. V. M. (CORNELL), AUBURN, ALA.

In *Lippincott's Magazine* for August, 1884, Albert Leffingwell, M.D., has the following to say on vivisection: "Pasteur, we are told, has claimed the discovery of a cure for hydrophobia through experiments on animals. It will be well worth its cost in agony if true, but we cannot forget that its practical value yet remains to be demonstrated. Aside from this has physiological experimentation during the last quarter of a century contributed such marked improvements in therapeutic methods that we find certain and tangible evidence thereof in diminishing fatality in any disease? Can one mention a single malady which thirty years ago resisted every remedial effort, to which the more enlightened science of to-day can offer hopes of recovery?"

I sincerely hope that the tender hearted anti-vivisectionist is still living, and that he has enjoyed a quarter century of scientific medical research that has been more fruitful than the one to which he alludes. I doubt not that the generation which ended at the time Pasteur made his wonderful discovery, gave the world little tangible evidence of the value and necessity of animal experimentation; but, to-day, the knowledge of what experimental medicine has done for the prevention and cure of disease is common property of the medical profession and the newspaper-reading laity. It is true that this has nearly all come to pass within the last twenty-five years, but the results of scientific research in this period have been attained only by the efforts of men trained many years back.

The Pasteur Institute in this city is concrete proof of the value of the great French scientist's animal experimentation. I

* This article was written in 1907. We shall be glad to publish any later views of its author in a subsequent issue of the REVIEW.

believe that any conceivable torture of the lower animals is justifiable in the sight of both God and man if thereby the life of a single human being can be prolonged or saved. On the other hand any discovery which tends to relieve the dumb brute of suffering at the hands of medical science is to be hailed with delight. The diagnosis of rabies has undergone an evolution which admirably illustrates the ideas just expressed.

The very existence of such a disease as rabies has been and is to this day doubted by members of both the profession and the laity. Historical and medical records give undoubted evidence of its existence four centuries B. C. Aristotle doubted its infectiousness to man while admitting its deadly character. In all other animals bitten, Homer tried to involve the dog star or Orion's dog in the malignancy of the disease, hence the idea that it is more prevalent in summer than in other seasons. Pliny conceived the idea of a small worm in the dog's tongue, hence the practice of worming. Up to 1804 the diagnosis of rabies must have been purely empirical or at most clinical which is at best rather ticklish business to say nothing of being unsatisfactory. Every veterinarian is familiar with the suspicious-looking dog with a still more suspicious history and a "bone in his throat" that none but the boldest care to remove. Zinke, in 1804, probably made the first effort to establish the infectiousness of the disease by animal inoculation. He produced rabies in dogs and rabbits by inoculating rabid dog's saliva into superficial wounds. Since then enough animals and human beings, too, for that matter, have been inoculated to convince the most skeptical that a rabid animal's saliva contains the virus that will reproduce the disease if introduced into the tissues of another warm-blooded animal.

Although the virus is undoubtedly in the saliva, it has never been separated or isolated from all other contaminating material. The isolation of the etiological factor of an infectious disease is of fundamental importance from every viewpoint in the study of the disease. Next to isolating and studying the bac-

terium, protozoon, or other causative agents in a given disease, the discovery of where it is, in what tissues it exists, and something about its size, virulence, and resistance to thermal and chemical disinfectants, is of great importance. While it is doubtful if anyone has ever seen the organism that causes rabies and knew it to be such, still we do know enough about the properties of the virus to work with it intelligently.

In 1881 Pasteur showed that the brain was always affected and could be inoculated into the surface of the brain of a healthy animal and produce the disease. For this purpose rabbits were and are even to this day used, though to a less degree by far. This method is familiar to both veterinarians and physicians, and requires, in addition to the rabbit and instruments, a knowledge of both bacteriology and surgery. The operation being done under the influence of ether, the animal suffers little and later seems to experience no discomfort until the period of incubation has passed. This entails the necessity of waiting at least two to six weeks, during which time the person bitten has an equal chance of developing the disease. With this method moreover the introduction of putrid material often brings about the death of the test animal before the development of rabies.

Babes reasoned "that this disease, so clearly characterized by a train of symptoms, constant in their character, ought to present characteristic lesions in the nervous centers, and especially in the ganglia of the nerves which preside over the symptoms." This hypothesis resulted in the discovery by van Gehuchten, of certain changes in the plexiform ganglion determinable by histological methods. This ganglion is situated just outside the foramen lacerum basis cranii on the vagus nerve. The histological procedure adopted by Moore and Way of the N. Y. S. V. C. is as follows: "As soon as the ganglion is removed, it is placed in Flemming's fluid for a few hours, washed in water, carried through alcohols and sectioned by the paraffin method. With this method of fixation it is almost imperative that the sections be stained with iron or Delafield's hematoxylin, of which we have found the latter the most convenient." Other fixatives have been

used, admitting of other staining reagents. The ganglion of a normal animal is composed of a fibrous capsule that sends into the interior, supporting fibers for the nerve cells, each of which is enclosed in an endothelial capsule. The changes in the ganglion of a rabid animal consist in the atrophy, and the invasion and destruction of the ganglion cells, as a result of new formed cells evidently from the endothelial capsule. This method is at the disposal of only an expert in histological technique who has at his command a well equipped laboratory and, while it saves the life and suffering of a rabbit, it is available only in cases where the disease has run its full course; this latter restriction is sufficient to make it a very unsatisfactory diagnostic measure for routine work.

Negri, who was one of the first to use this method, must have thought that a better and an easier was possible; for even the dissecting out of the plexiform ganglion is a less desirable operation than that adopted by Negri later. Any method for diagnosing rabies should answer the following requirements: Infallible at any stage of the disease, requiring simple technique and covering the shortest period of time, sufficiently vivid in its manifestations that it be available by any one with a good pathological training. I believe we have such a method at our command.

The finding of the Negri bodies is at present the object of diagnosticians when dealing with a suspected case of rabies. It is not to be supposed that everything has been learned about the Negri bodies and the pathology of the disease. On the contrary it is desirable that every case of rabies be studied carefully and the notes recorded and made public so that the results may be compared and statistics made more valuable. A few cases have recently been studied at the laboratories in the Veterinary Department of the A. P. I. The brain is removed in the usual manner as soon as possible after death. When an animal is to be killed care should be taken not to injure the cranium; and experience has taught me to ask that the head be brought to the laboratory rather than the brain. In one instance when a

gentleman was asked to bring the brain of a hog that had died with symptoms of rabies, a mess resembling scrambled eggs was cautiously conducted into the laboratory in a spacious shoe box, and to the great horror of the owner of the lost animal, I sorted out what appeared to be a piece of cerebrum with my bare hands. Right here I would like to remark that the questions that a farmer can ask about infectious diseases would put a small boy to shame and puts a young veterinarian in a position where he has to say "I don't know" frequently or tell some pretty big lies.

Experiments have shown that the Negri bodies are most constantly present in the cells of Ammon's horn (hippocampus major). To get sections of this part of the brain, make an incision a little to one side and parallel to the longitudinal fissure of the cerebrum, thus laying open the lateral ventricle. The hippocampus major lies in the posterior part of the floor of the ventricle. Small pieces are excised by cutting at right angles to the length of the horn and placed in Zenker's fluid for 12 to 24 hours, in running water, 67, 82 and 95 per cent. alcohols, and cedar oil, each, for an equal length of time. By placing the tissues in the incubator and maintaining a higher temperature, these periods may be cut down to four to six hours each. The sections are then infiltrated with paraffin for 12 to 24 hours and imbedded. Sections about 9 microns thick are fixed to slides with albumen fixative and after a few hours in the incubator are ready to stain. The following procedure is adopted: Chloroform, 3-5 min.; xylol, two changes, 5 min.; 95 per cent. alcohol, three changes; iodine alcohol, 5-8 min.; 95 per cent. alcohol to remove iodine; sat. alcoholic solution eosin 15-30 min.; wash in water; Loeffler's alk. meth. blue, 5 min., wash in water, differentiate in 95 per cent. alcohol; carbol-xylol, 3 min.; xylol, 3-5 min., mount in Canada balsam. A different staining method suggested by Frothingham (*Jour. Med. Res.*, vol. XIV., No. 3) consists in using Unna's alk. meth. blue stain and 5 per cent. aqueous eosin, equal parts for 15-30 min., wash in water, Unna's stain 3 to 5 min., and proceed as above, gives very good results.

The Negri bodies are found in the cell body of the cells of Ammon's horn and vary in size from minute dots to round or oval bodies, sometimes as large as 27 microns in diameter. They stain distinctly with eosin while the nucleus of the cell takes the blue stain and within it can be seen the nucleolus. By using Unna's blue stain a sharper differentiation between the Negri bodies and the structures of the cell can be secured than by the alcoholic eosin and meth. blue. At least a dozen slides should be stained and examined in every case. I have made a practice of using a 2-inch ocular and a $1/16$ inch oil immersion objective B. & L. and I try to find the cell, nucleus, nucleolus, and then the Negri bodies or "cell inclusions." The finding of the Negri bodies is sufficient to condemn the animal; failure to find them brings up a question which has yet to be answered.

For about a year and a half attempts have been made to simplify the technique and hasten the operation by making smears from the Ammon's horn. This method has been successful in the hands of P. B. Hadley, of Brown University; Dr. Anna W. Williams, of New York City, and C. Way, of Cornell. The method employed by Dr. J. N. Brawner, of the Pasteur Institute at Atlanta, Ga., appeals to me as being the most satisfactory. This consists in removing a piece of the dark cellular layer of Ammon's horn with a platinum loop and gently drawing it over the surface of a cover-glass so that the cells are evenly distributed and subjected to no unnecessary crushing or distortion. The smears are then fixed with heat or methyl alcohol and stained as in case of sections or with fuchsin instead of eosin and mounted in balsam. The method requires considerable practice for its successful application, but a diagnosis can be made in 30 minutes.

LOUISIANA BULLETIN No. 122, JULY, 1910, is devoted to the consideration of rough rice as feed for horses and mules, from the pen of W. H. Dalrymple, M.R.C.V.S., and is a valuable contribution to the literature on dietetics; showing this cereal to be economical and beneficial as a foodstuff.

CEREBRO-SPINAL MENINGITIS.*

By H. J. MILKS, D. V. M. (CORNELL), OWEGO, N. Y.

During the fall of 1906 and the spring of 1907, the writer had an opportunity to study Cerebro-spinal Meningitis in Louisiana. It was known as Staggers, Sleepy Staggers, Bottom Sickness, etc.

OCCURRENCE.—The disease was not confined to any particular locality. It occurred in the lowlands and in the hill and bluff districts. It attacked animals of all ages and, I believe, horses more than mules. The outbreak extended over a large area, but did not attack many animals at the same place, although one owner lost all his horses (3) in the course of three or four days. Animals were attacked at rather widely separated places. I have seen it upon both sides of a bayou, extending several miles. It was not confined to animals fed on any particular food-stuff, though the majority were allowed to graze.

CAUSE.—Numerous theories have been advanced as to the cause of this disease. It has been attributed to grazing upon low marshy lands, hence the name Bottom Sickness. The cause has also been laid to mouldy corn or fodder, poisonous plants, exposure to sun, impure water, etc. Mayo, reporting a similar disease, concluded it due to a fungus (*Aspergillus Glaucus*). He has also recovered this fungus from the different organs. Chester, of the Delaware Station, carried on a series of feeding experiments with negative results. Some have even pointed out the infectious nature of the disease.

In Louisiana, the disease attacked animals upon such a varied diet that it is hard to connect it with any particular food. As will be seen later from the case reports, the disease attacked ani-

* Presented at meeting of N. Y. S. V. M. S., Ithaca, 1909.

mals fed upon hay and oats, hay and corn, oats and grass, corn and grass and grass alone. To be sure, many of the animals alleged to have had no grass, probably have had it to a limited extent.

To my mind, it can hardly be attributed to toxic plants or a greater number of animals kept under exactly similar conditions would have taken the disease instead of such widely separated cases. This also applied to the theory of infection, as it seems that a greater number of animals would have been affected.

SYMPTOMS.—In the mild cases we got dullness, hanging of the head, paresis or slight loss of control over one or more limbs, slight rise of temperature, 102° to 103° F., and often difficulty in swallowing. The visible mucosæ were congested and brownish yellow. In these mild cases the weakness never became so great that the animal could not stand, and usually it was able to take some nourishment and water.

The more severe cases were manifested by the same general symptoms often, however, the respirations were much increased and labored. The temperature ran 104° to 105° F. The pulse might remain practically normal or be accelerated and hard. Opisthotonus was not marked nor often present. These cases became rapidly weaker, often partially blind, stood with all legs in a bracing attitude, and sometimes sought support against the side of the stall or fence. Sometimes they were delirious and would stand with head pressed against the wall or turn in a circle, always in the same direction. Frequently in their delirium they would walk through fences and over other obstacles. There was sometimes heat in the region of the pole and coldness of the extremities. Usually the severe cases were unable to stand after twelve to thirty-six hours, and fell unable to rise again. They then died in delirium in a few hours or lay in a comatose condition for from twelve to twenty-four hours. In the delirious cases the temperature usually kept up pretty well, respirations and pulse were also much accelerated, while in the comatose condition the pulse returned to about normal; temperature nor-

mal or even subnormal, and respirations as though the animal was in deep sleep.

As the disease progressed, we occasionally got a fetid discharge from the nose and mouth, due no doubt to decomposition of the secretions retained in those parts.

In the severe cases the animals usually refused food, but showed a desire for water, though unable to drink. The digestive tract was almost completely paralyzed. Purgatives seemed to do little good no matter what the dose. The hypodermic use of eserine or arecolene did not produce purgation, but did exhibit other physiological phenomena.

COURSE AND MORTALITY.—The disease generally runs a rapidly fatal course, lasting from a few hours to four or five days, usually not more than three or four days. The time given by some authorities, eight to twelve days, is entirely too long except in those cases that survive.

In those cases that survived, the disease attacked slowly, the animal usually taking some nourishment and showing all the symptoms of a mild attack.

The mortality was 90 per cent. or more. Treatment availed little, unless started in the first few hours of the disease, and even then prognosis was unfavorable.

In our investigations the post mortem lesions were based upon five cases. In all cases the blood vessels of the brain and meninges showed congestion. Otherwise the brain substance and cord appeared normal. Cross sections of the brain and medulla showed much echymosis and extravasation of blood. In some cases there was much fluid beneath the dura; in others only a slight amount. No softening or other macroscopic lesion could be detected.

The blood was usually dark and did not clot readily. Heart was usually normal but frequently contained ante-mortem clots. The lungs were normal. The digestive tract was apparently normal except that the posterior end usually contained much dry fecal matter. In one case there was marked congestion of the last fourteen to sixteen feet of the small intestine. In another

there was slight congestion. However, this condition did not show from the exterior and may have been overlooked in other cases.

The liver usually contained much blood, spleen normal in size and appearance and might contain much blood or be very dry. The kidneys showed slight congestion, but were otherwise normal in appearance. The bladder usually contained apparently normal urine. Microscopic examinations were made of the brains and kidneys of two horses and the liver, spleen and intestines of one. Briefly stated there was shrinkage of the cells of the nervous tissue of the brain and inflammation, especially around the blood vessels. The blood vessels also contained much blood. The kidneys and liver showed some granular degeneration and congestion. In one case the blood vessels of the kidneys showed a condition similar to those of the brain. The spleen appeared normal, except for the large number of white blood cells.

A description of a few cases will be given in order that a better picture of the disease may be obtained.

CASE 1.—Mare in the first stages of the disease was slightly blind and so weak that she would stagger if moved. Temperature 104° F. Respirations and pulse much accelerated. She was still able to eat and drink. This was eight o'clock in the evening; the following morning she was down, unable to rise, but continually struggled to do so. Was unable to stand when assisted to her feet, quite blind and delirious. Temperature, 100° F. Respirations and pulse slightly accelerated. Visible mucosæ anaemic.

CASE 2.—A large mare, in good condition, was attacked Tuesday morning. In the evening was given a purge with no appreciable results. On Wednesday she fell and was unable to rise. Thursday night I saw her a few minutes before she died. At this time the pulse was very rapid, respirations labored, and temperature subnormal. This animal was used in a livery and was first noticed ill as above stated. The first symptoms were drowsiness, weakness, and persistent turning in one direction. She grew rapidly weak and fell as above stated. Her food had been

timothy hay and oats, both of which had been shipped in from the northern states.

CASE 3.—Gray mare in fair condition, was taken ten o'clock Thursday night. The following morning her temperature was 104.8° F. Pulse and respirations slightly accelerated. Very weak and stupid. Ice had been applied to the poll and back during the morning. She grew rapidly worse and was unable to stand after a few hours. An aloes purge was given, but no action from the bowels was obtained. She died Saturday morning. Feed—Corn and grass. The corn was native grown and from the same crib from which she had been fed all winter and spring.

CASE 4.—This was a young high-strung saddle horse. Was used one half day Monday and seemed perfectly well. The following day at noon was noticed sleepy and drowsy, though he had been playing in the stable during the forenoon. He was then given a pint of raw oil, and kept quiet until a local veterinarian was called Thursday morning. At this time the temperature was 105° F. Ice was used upon spine and head until he fell Friday at three in the afternoon, after being sick sixty-three hours. However, after resting a few hours he was able to get up, but soon fell and was then unable to rise again. At this time his temperature was 104° , pulse 58, respiration 36. His temperature was never less than 104° , often as high as 106° , and just before he died it reached 108° . Respirations 72, pulse impossible to count. This animal was sick four days and fourteen hours, never seemed to lose consciousness and seemed to suffer most of the time.

BACTERIOLOGICAL INVESTIGATIONS.—Cultures were made from the different organs of several animals, but with the exception of one case in which there was evident contamination, no growth took place. Smear preparations were also made from the different organs, but nothing definite could be determined.

INOCULATIONS.—In all, nine animals were inoculated, four rabbits, four guinea pigs and one horse. The animals were all adults and the inoculations made subcutaneously. The inoculating material was defibrinated blood, citrated blood, and brain

emulsion. In some cases the material was taken to the laboratory and used, in others the experimental animals were carried to the place of autopsy and there inoculated. Negative results were obtained from all inoculations.

CONCLUSIONS.—(1) The cause of the disease or its infectious nature has not been determined by these investigations. No micro-organism was encountered that could account for the disease.

If we accept the statements of the different owners, regarding the character of the materials consumed by the animals as absolutely accurate, then the theory of food contamination does not seem to hold good for the following reasons:

(a) The low per cent. of animals attacked under exactly similar conditions.

(b) The widely separated cases.

(c) The fact that the animals attacked were not confined to any particular feed or combination of feeds.

(2) The pathological findings pointed out changes in the blood vessels of the brain and mininges. Degeneration and some other changes were present in some of the internal organs. Just how much of these changes were due to the disease and how much to post mortem changes is hard to say. In that climate post-mortem changes take place so rapidly that it is difficult to get suitable material for study.

NOTE—I have purposely omitted many of the details in this paper. For those who desire a complete account of the investigation, I refer to Bulletin No. 106 La. State University Experiment Station, Baton Rouge, La.

HORSE SHOWS IN 1910.

Warrenton, Va., August 31- September 1.	Bryn Mawr, Pa., September 28-30.
Newport, R. I., September 3-6.	Brockton, Mass., October 4-7.
Rutland, Vt., September 6-9.	Louisville, Ky., October 10-15.
Syracuse, N. Y., Sept. 12-17.	Atlanta, Ga., October 18-21.
Ogdensburg, N.Y., Sept. 19-23.	St. Louis, Mo., October 24-29.
Poughkeepsie, N. Y., Septem- ber 28-29.	New York (National), No- vember 14-19.

THE IMPORTANCE OF THE VETERINARY PROFESSION AND THE STANDING OF THE VETERINARIAN IN THE WEST.

BY DR. W. W. YARD, STATE DAIRY COMMISSIONER AND SECRETARY OF STATE
VETERINARY EXAMINING BOARD, DENVER, COLO.

Having been born and educated in New York City, I was, as many others, led to suppose that the veterinary profession outside of the large cities did not amount to anything; but some years of quarantine work on the western ranges for Uncle Sam has impressed me with the great field among the farmers and stock interests of the country.

There used to be a day when the army required its cavalry officers to read up on the horse as well as shoeing, but now that there have been enough regularly graduated veterinarians put into the field, this is entirely changed. The farmer used to think that no one knew anything about live stock except the farmer, and when one of their animals would become ill, several farmers would get their heads together and do something for the sick animal; but this has all changed also.

There is hardly a city or town of any size either in the mountains or plains that has not one, and in some cases a number of graduated veterinarians. And men from the best colleges, too, like the University of Pennsylvania, Cornell, and a number of the larger colleges who have their graduates all over the west.

A farmer to-day never any more thinks of treating his own stock like he used to, than flying with Polhan. And in some sections of the stock country you will find the veterinarians so busy in the fall and spring that you cannot get hold of them at any time. The farmer has learned not only to call the veterinarian as a professional man, but as an advisor, realizing that an up-to-date veterinarian is versed on nearly everything pertaining to a farm. You will find in many cases that a veterinarian is

called upon to give his opinion as to the kind of animals to buy, say for dairy stock, for beef stock, hogs and sheep. The veterinarian is taken into the confidence of the farmer, and he is called on for a great deal of information; therefore the average veterinarian of to-day is not an ignorant man with the exception of knowing something about diseases of live stock, but is well up on everything. This is true and is a matter of some years of observation. It is not a case of the farmer sending his boy east to a veterinary college as it used to be, say fifteen years ago, but it is the city boy who has studied veterinary medicine at some first class university coming out and doing business with the farmer, the farmer's boy going into city life as a clerk, in the army or navy and number of commercial lines; as the salesman from New York or Chicago who comes right out and goes and visits the farmer, probably selling him a large bill of goods. It is this which has made the farmer so intelligent; he has had a chance to meet education, and not pass years of his life without hearing anything spoken of but his own farm products. The farmer in the west is as well conversant with the fact that the Pennsylvania Railroad is building the largest station in the world as the man who lives within five blocks of the station. The farmer to-day is a business man; he keeps books; he reads books and sends his sons and daughters to the universities; and it is this which has brought the city and country so forcibly together, and it is this intelligence which has taught the farmer that his stock in trade is his stock; and when he loses his live stock, he has to do more bookkeeping, and the veterinarian is his best friend.

Take the state of Colorado, and you will hardly find a town in the Rocky Mountains of any size that has not its graduate, and this graduate has the pick of all the surrounding country. This is the cause of the western states having to pass veterinary laws which they have and are doing.

There used to be, and are now, a large number of men who have never been to college. They call themselves veterinary dentists and call at different sections every few months to file teeth. They used to give the farmers the impression that *they* were the

veterinarians of the United States, but by the farmers sending their children to the city to be educated and their reading and traveling themselves, they have found out that these fellows are but a lot of fakirs. So well is this demonstrated, that at the last session of the legislature of Colorado the graduates of the state got a veterinary bill passed, in which a man, no matter if he be graduate or quack, he must take an examination before a veterinary board appointed by the governor, so that every one will know whom he is employing; and if he really knows enough, he can go out and say I am a non-graduate, I have had five years or more of practical work, and you can take me or not as you please. That is what Colorado did. It made the two classes, giving the graduate his place where he belonged, and not have to be classed as a veterinarian with some farmer who could not make a success of farming, so went out to torture dumb animals under the guise of a veterinarian.

The graduate veterinarian to-day in Colorado, no matter from what school he comes (and, by the way, he must be from a school which is indorsed by the government) must take an examination before an examining board.

There used to be a time when some of the city and state offices were held by non-graduates; but to-day there is nothing but graduates, and those of the highest standing in the profession. Even the testing of cattle for tuberculosis is against the law unless a man is licensed, and in case there is any reason proven for a man to have his license revoked, the law gives this right to the examining board. This board has licensed all the old graduates who already had been licensed by the state. But now every man who wishes to hang out his sign must take an examination, which generally has lasted two and a half days, being practical and theoretical. The state only recognizes graduates that are eligible to take the United States Government examinations, and that means that in time there will only be men from three-year schools. I know positively of three men in this state who each have a practice of at least seven thousand dollars a year, *all* among the farmers and stock raisers.

SOME EXTEMPORANEOUS REMARKS ON COLIC.*

BY THOMAS B. ROGERS, D. V. S., WOODBURY, N. J.

I think we bury a great many colic cases every year from the fact that we include all of our cases of intestinal pain under one class as colic. I have for a large number of years tried to differentiate these cases, and I think with some degree of success, and I divide them into three sections. The first, where you get the intense pain, with intervals of ease, normal pulse, and respiration, between the paroxysms of pain. In those cases which years ago we called true spasmodic colic, I have never seen the necessity of giving more than a small hypodermic of morphine, and they are the only cases in which I do give morphine.

There is another class, what the French term congestive colic, that will give us a great deal of trouble, if we do not arrive at a correct diagnosis. In this condition you get carbon dioxide poisoning, pulse thin and thready, and if the temperature is taken you will usually find it subnormal. There is a tendency to lie down quietly, and that tendency in some cases is so great, that he even won't get up under the whip.

When I get one of those cases I very promptly bleed it, and I take if possible a bucket of blood, and if you bleed one of those cases, with the finger on the artery, you will see how the pulse comes up with the blood flow. The third cases of intestinal pain are those cases where you have loss of intestinal peristalsis, with indigestion, and necessarily must be treated in still another manner, and if we are going to adopt a routine method of treatment, for all the different classes, we are going to fill our corner of the equine graveyard.

*Minn. State Vet. Med. Association

I have a friend in England, Mr. Caulton Reeks, and you are familiar with his writings; he is the English authority on colic. He recommends $2\frac{1}{2}$ grains of eserine.

You get a great many symptoms from this you do not want. You put the horse out of business, and what you want from eserine is to get increased action of the muscular coat of the bowel, and when you get that you have all you want. I wrote to Mr. Reeks and told him I thought the dose was excessive, and sent him a tube of tablets I was accustomed to use, and some few months ago I received a letter acknowledging the same. He said that from that $\frac{1}{4}$ grain of salicylate eserine and $1\frac{1}{2}$ grain pilocarpine nitrate, he got all the effect necessary, and was fully convinced that the dose he advised in the last edition of his work on colic was too large.

The gentleman spoke of barium chloride. I use it, but would be very careful in using barium chloride until I had taken other means to soften up the impaction. I should rather expect to get in trouble, and I think some of the troubles with barium chloride have been through giving it in ill advised cases. You cannot take up the use of any remedy as a routine and not get in trouble once in a while. To soften up the impaction powdered ipecac is very valuable. It promotes secretion. We all know how we are called to see a case of colic, and in a few days after get pneumonia. The owner has drenched the patient, got some liquid in the trachea, and set up traumatic pneumonia; he is going to die. I do not like to drench a horse. I get a great deal of benefit from continued irrigations of warm soap suds.

Another condition I would like to say a word on. It is a very important thing for us to be able to differentiate the pain due to a twisted intestine from colic. It is a very nice thing to go in and examine a horse carefully and finally turn to the owner and say, "In my judgment you have a case of twisted intestine and this patient is going to die." After the patient dies, and you show the owner the trouble on autopsy, you have a client for life.

In most cases of twisted intestine you have got the Hippocratic face of peritoneal pain, constant pain and tendency to get

on back. Another point that is present in most of my cases is, that if you auscultate the flanks you get a dropping sound as of water falling into a well. Your pain is practically continuous, and morphine is a good diagnostic agent, because while morphine is an antidote to pain, pain is an antidote to morphine. If you can give a horse from 10 to 15 grains without effect, you can make up your mind you have a twisted intestine. I have felt considerable satisfaction in mapping out these cases.

In impaction you get continuous pain, but your horse will have more or less comfort.

I never saw a case of twisted intestine eat or drink.

Another point in that connection is this, is twisted intestine primary or secondary? I mean is it due to something occurring before the manifestation of pain, or is it due to rolling? I had a case some years ago where the condition showed it was primary.

A pet horse was taken to the blacksmith shop; he was in perfect health when taken to the stable; the owner allowed him to take his customary roll; when he arose he evinced pain which was constant until he died. Autopsy showed intestinal strangulation.

P. H. BROWNING, San Jose, Cal., writes: "Enclosed find check for \$3.00 for which please renew my subscription for the REVIEW, the best friend of the veterinarian."

DR. J. T. SHANNON, of Lexington, Ky., was recently appointed live stock inspector for Fayette County. The doctor began his duties at once by inspecting the sheep exhibits at the Blue Grass Fair, preparatory to their being shipped out of the state.

THE many friends of Dr. William Sheperd, of Sheepshead Bay, will be pleased to learn that his recent accident, caused by a large double-deck automobile frightening his horse, while driving, while painful is not serious. The doctor was pretty well bruised and shaken up, from the fact that he held on to the reins after being thrown out of his buggy, and was dragged a considerable distance. However, he has managed to get around and attend to his practice despite his sore condition.

REPORTS OF CASES.

VETERINARY OBSTETRICS.*

By DR. G. U. MARCHAND, Uhrichsville, O.

My subject for this occasion is Veterinary Obstetrics, and a brief case report of Dystokia in mare, cow, bitch and sow. The generation and development of animated creatures is correctly described as an "eminently physiological act," and one which is generally carried out from beginning to the end, as a perfectly natural process, and without any extraneous interference being required for its accomplishment. But, speaking now with regard to the higher order of viviparous animals, this happy termination of a most important series of phenomena is not always observed; and not infrequently various causes, internal as well as external may operate unfavorably in a number of ways, and more or less imperil the perfect development or existence of the young creature, or compromise the health or life of the mother. More especially is this danger likely to occur when the period arrives for the expulsion of the foetus from the abdomen of its parent. With the domesticated animals, when these obstacles to development or birth intervene in order to remove or overcome them, and assist or supplement the natural efforts, recourse must be had to artificial means, and the resources of science and art are accordingly invoked. The term "Parturition" is applied to the act by which the product of conception when it has reached a certain stage of development, is expelled from the body of the mother; and this act is that which is usually considered to be the most critical in the existence of the young creature, and to most frequently demand attention in such valuable animals as the mare, cow, sow, etc. The parturition of the domesticated animals and the abnormal condition which may precede or follow that event, come within the province of veterinary science and from that division of it named "Obstetrics," which has aptly been designated the "Science of Midwifery," when applied to this division of human surgery. Though it is that which has been selected as the title of this paper, and though it is also that which is most frequently employed in technical speech by the veteri-

*Read before the Ohio State Veterinary Medical Association.

narian, yet it is not correctly applied with respect to animals as it is to mankind; inasmuch as, according to one derivation it implies to "stand before" (obstare), whereas, in aiding in the birth of animals the operator generally stands behind the creature which is in difficulty; though if the derivation from obstare, which also means to "oppose," be accepted, then the term is quite justifiable and expressive. The term "Obstetrics" is not, as has already been shown, limited to the act of parturition—certainly one of the most important, and yet difficult, of all the animal functions; for it includes not only rules which should be followed in order to remove or remedy the material obstacles or accidents which may hinder the accomplishment of the act, but likewise embraces everything connected with the health and preservation of the female parent and the young creature while they are in the closest relation with each other before parturition, as well as for sometime after their disjunction. It, therefore, essentially comprehends a mechanical portion, which consists in devising means for surmounting obstacles that may impede the birth of the young animal, and scarcely less important, a thorough knowledge of those complex functions and conditions connected with conception, generation, and the parturient state. The veterinarian then, to be a successful obstetrician, must possess special and varied information of a highly scientific kind in the domain of anatomy, physiology, hygiene, pathology, surgery, etc., and to this must be added the benefits to be derived from experience. The science of veterinary obstetrics, then, demands a perfect acquaintance with the anatomy and physiology of the generative organs and the region in which they are situated in the different animals. The study of the organs concerned in generation is essential to acquiring a knowledge of their several functions, and it is only through understanding these functions that we can appreciate the normal or abnormal course they may pursue, and be prepared to interfere successfully when required, and a correct notion of the formation, structure, magnitude and other features of the region containing these organs and which has been named the pelvic cavity, is absolutely necessary if we wish to understand the act of parturition in the several animals, and to be able to render useful service when delivery of the young creature is hindered by mechanical obstacles. A knowledge of the physiology of these organs and the phenomena pertaining to generation—the formation of the foetus, its development and external conformation, and its connections with the parent, with

gestation and the modifications it produces in the organism—as well as anomalies, accidents, and diseases which may occur during this period, is required, in addition to an acquaintance with that of the final act which we have named "Parturition."

The four chief functions of the generative system may be enumerated as follows: Oestrus, conception, gestation and parturition, all of which are intimately related to and dependent upon each other—a failure or defect in one disturbing their relationship and leading to sterility or irregularity in reproduction. Deviations or anomalies in form or structure of the individual organs upon which these functions rely for their proper performance, will also tend to interfere more or less with their accomplishment. The difficulties attending parturition, whether they depend upon the mother or the foetus, or upon both, with means of overcoming them, and the accidents which may complicate difficult parturition, is called *Dystokia*.

Cases of dystokia are much more frequent in the bovine species than in any other, and least so, perhaps, in the equine species. These two species are those to which the veterinarian is generally called upon to attend during protracted or difficult parturition, and every practitioner who has had any experience in this matter, will agree that for one case in the mare there will be at least ten in the cow. Cases of dystokia are not infrequent in the bitch and quite frequent in the sow. A very great disadvantage under which the veterinary obstetrician labors in cases of dystokia is the late period at which his services are generally called into request, and often after serious and even irreparable injury has been done by unskilled hands, and this in instances in which a little scientific manipulation and some surgical knowledge would have perhaps, made all right and safe in a few minutes. The services of a veterinarian can be beneficial only on the absolute condition that he is present in good time. Called upon too late, when the "waters" have escaped for a long period, and the neighboring empiric has exhausted his science, aggravated a bad presentation, irritated the generative organs by manipulations, tractions and violent means; then the ability of the most experienced practitioner may be useless. He will find the passages dry, burning, swollen by inflammation, the foetus more or less advanced in the pelvic cavity, where it may be said "wedged" with the uterus spasmodically contracted on itself, and so closely applied to the body of the foetus that it is almost impossible to pass the hand between them. How is it possible to manipulate in such a

place—how change the vicious position of a foetus which the greatest efforts cannot make advance or retire? How can a sharp instrument be carried into the uterine cavity and be used with safety, when the hand alone can scarcely be made to enter it?

The conditions under which the veterinarian has to perform his task are not favorable or encouraging. In practising these manipulations, the operator has to contend with the struggles and disordered movements of the animals, which sometimes, in the midst of its sufferings, does not hesitate to use its feet, horns, or teeth as weapons of defense, or to crush its medical attendant against the adjacent wall. In addition, the violent contractions of the uterus, and especially of the cervix, fatigue the operator extremely; sometimes these manipulations have to be continued for hours, destitute of light, and perhaps, cold, wet and dirty, exposed to draughts and every kind of discomfort; most frequently, too, he is left to his own resources; and all this after driving long distances, often at night and in bad weather, etc.

CASE REPORTS.

Case No. 1.—On May 1, 1909, at 4.00 a. m. I was called to the country to see a small bay road mare. On my arrival I found a Sterno-Sacral Presentation of Foetus, with its front limbs protruding out of mare's rectum above the carpus, and head out of vagina. I at once undressed and prepared myself to save the mare's life, making my hands and instruments as aseptic as possible. I amputated the limbs above the carpus, pushed the remaining portion through the laceration into vagina; owing to the tumified condition of vagina and vulva, it was necessary to cut the remaining portion of each limb to necessitate an easy delivery, removed the placenta, sewed the laceration, prescribed diuretics and febrifuges, and laxative diet; also irrigations of creolin solution to affected parts. The mare defecates and micturates normally and made a complete recovery.

Case No. 2.—May 9, 1909. On Sabbath morning I was called to see a cow in the suburbs of our city. On my arrival I inquired for the owner. The reply was, "Father and mother went to church and they told me to help you." So I asked him where the patient was that required my attention. He took me over to a small pen built of rails, and here she was, lying down. I made her get up and interviewed the case. The son told me she was sick since Thursday. She showed colicky pains. I

asked him whether she was pregnant. "Yes, sir, her time is up," was the reply. Well, then, I advise you to take her to the barn and get some warm water soap and a towel. I made an examination per rectum and detected a torsion of the uterus. By this time two of the neighbors called and I asked them for their assistance. I then proceeded to cast the patient, secured her, and disinfected my hands thoroughly, then passed my right hand into the vagina and plainly detected left torsion of uterus. Two and one-half turns of the cow was necessary to untwist the uterus. The foetus was delivered with some difficulty. Left treatment and called next day to remove placenta; after treatment consisted in the line of febrifuges, followed by tonics, and the cow recovered without complications.

Case No. 3.—June 29, 1909, I was called to see a fox terrier bitch which had given birth to a pair of nice puppies two days prior, but still showed signs of uneasiness and no appetite. I made an examination per vagina and detected a puppie, but as the vagina and vulva were so badly swollen, it was impossible to use instruments, so I at once advised an operation, which the owner agreed upon, as he realized the condition she was in. I carried her to my office in a basket, prepared her for the operation, and informed Drs. Demster and McCollams, two practising physicians, of the operation which was about to take place. On their arrival the operation began. Median operation preferred, the parts being previously prepared, an incision was made in the median line, the uterus exposed and an incision made into the uterus. Two dead gangrenous foetuses removed; membranes removed were green as grass. Uterus sutured with Lambert sutures, and external incision with silk; treatment, tr. echinacea internally and injections of creolin solution per vagina. The bitch died the second day after the operation. The operation was a success, as the patient died from septicæmia. The two orphan puppies did nicely nursing the bottle until they were large enough to partake of food themselves.

Case No. 4.—Cæsarian section in sows for the removal of foetuses where normal birth is impossible has always been to me a very interesting subject, although my experience is limited to only seven cases. The first case died, the other six cases made nice recoveries. Case No. 1, operated on August 7, 1905, at 10 p. m., died two days after the operation from enteritis and peritonitis; autopsy revealed accidental incision in small bowel. The young pigs, five in number, were raised on the bottle and made fine pets. My technique of operating is as follows: The sow is

cast on the right side, the hair over the left flank is shaved, and all loose hair is brushed away. I shave a large surface so as to allow of drawing much of the uterus out and not contaminating it by touching unwashed parts after the parts are thoroughly scrubbed. The ether is then administered and usually it takes a few inhalations to get them under, when I give it to some assistant to use as I direct. I wash my hands in an antiseptic, and with the sharp scalpel make a bold incision in the skin and muscular tissues down to the peritoneum, six to eight inches in length, almost vertical, but slightly slanting from the point of the ilium toward the sternum. When the peritoneum is laid bare, puncture a small hole with the scalpel, then introduce a grooved probe and make the incision to compare with the other incision. Insert hand and at once locate the contents of the uterus; ascertain how many foetuses are there and how they are distributed, which is a guide as to the procedure of their removal. I usually lift out the top or nearest horn of the uterus with its contents and lay them out on the washed skin of the mother, and, drawing down the horn to its bifurcation, make a longitudinal incision in the uterus large enough to extract a pig. I usually have an assistant grasp the pig and extract it, leaving myself with clean hands to manipulate the foetuses to one opening where the assistant will continue to draw them out. When the pigs are all removed from the upper horn proceed in the same manner with the lower horn, and when they are all removed, the placenta is carefully removed; close the incision in the uterus with catgut sutures. After suturing, wash the uterus that is contaminated thoroughly with antiseptic solution. When all is disinfected, replace the uterus and close the abdominal incision with strong silk, using the interrupted sutures. If the operation is a neat one, it will be hard to see the wound in the skin, as the parts come together so nicely, and a great many will heal by primary union. If we veterinarians can do this work successfully, there is no operation we do that commends more profound respect on the part of our farmer friends than this one of Cæsarean section.

PECULIAR ACCIDENT TO DOG.

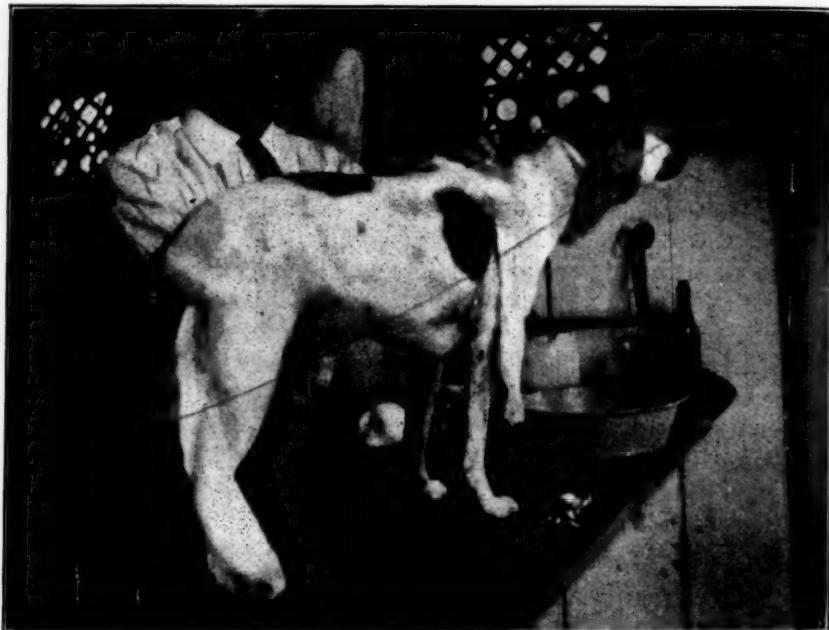
By WM. D. HOWATT, V.M.D., Portchester, N. Y.

Aged fox terrier bitch running through tall grass suddenly began to cry out as if in severe pain. When found, she was sus-

pended upon a tooth of horse hay rake, entering just back of right shoulder and coming out of thigh just above hock joint.

Muscles back of shoulder lacerated badly and those of thigh also badly lacerated, in fact, torn and pushed through opening in skin.

Point of rake tooth must have glanced off of one of ribs and simply separated skin from flesh. The illustration shows a



large seton needle inserted in wound, and at each end a piece of gauze bandage fastened to needle.

Accident happened June 19th, and on July 22d patient went home entirely healed, with no indication of any permanent lameness.

HERMAPHRODITE OPERATION.

By Dr. H. E. MYERS, Fostoria, Ohio.

On July 11, 1910, I was asked by Dr. J. W. Rossiter to assist in performing an operation, which, being somewhat out of the ordinary, I will endeavor to describe.

After arriving at the farm a distance of ten miles, we were informed that our patient was in a pasture of 100 acres with some other colts. The owner had given us just enough information to stimulate our curiosity on our journey around that pasture, even though the temperature was 105.

We were taught, however, that perseverance brought success, so after about two hours of crawling under and climbing over shackle rods of which the field was full, being an oil farm, we succeeded in driving the colts into a shed. By this time we as well as the colts were hot (and it was a dry town), but we had only began, for the colt had never been haltered, and we had to get a rope around his neck and choke him down three times before we succeeded in getting the harness on. We were saved the trouble of casting, for he laid down, and we had him tied before he could get up.

He, she, or it was a black road colt two years old, with the actions of a male, would attempt coitus, but of course could do nothing unless he backed up, which he evidently had not learned. There was a rudimentary vulva in the normal position. Protruding from where the clitoris should be was a penis about four inches long and one and one-half inches in diameter while erected. The mammary glands were well developed, in fact were large for a two-year-old.

Dr. Rossiter being in need of rest, I took my time in making an examination and disinfecting the field of operation.

An incision was made through the skin close to the flank on account of the mammary glands. After dissecting in about two inches, an enlargement was discovered which looked as though it might be a testicle, but proved to be a convoluted portion of the dorsal artery surrounded by adipose tissue.

An entrance to the abdominal cavity was made through the inner oblique muscle close to the median line. Just passing two fingers the testicle or spermatic cord could not be found. The entire hand was introduced and the right testicle was found attached to the psoas magnus muscle about five inches anterior to where it should have been. The cord was very short, but having a wound that was plenty large by this time, we succeeded in tying the cord with catgut. The left testicle was found about opposite of the right.

The testes were about the size of a small walnut smooth and firm with no signs of an epididymis; the internal wound was closed with interrupted catgut sutures, dressed with tr. of iodine

and a pack of absorbent cotton, applied over which the skin was sutured just tight enough to hold the pack.

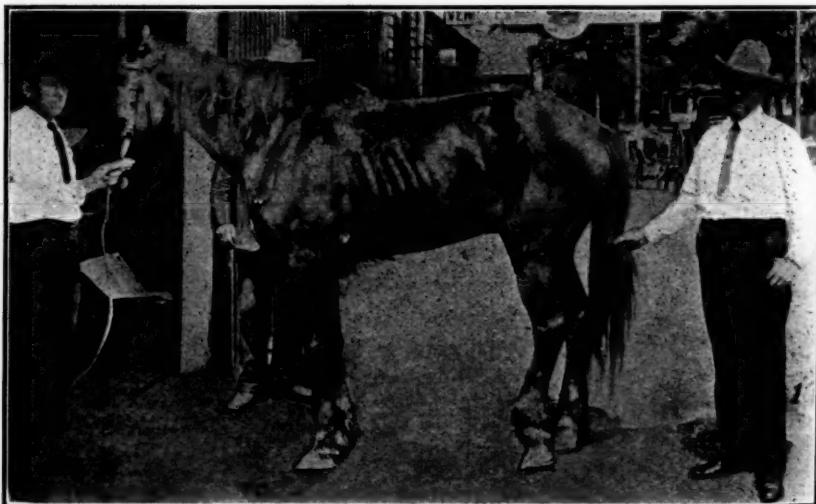
After the operation the colt was turned back in the field and allowed to run. Three days later we removed the stitches and pack and found the wound in good condition; no swelling except a very little at the umbilicus, and the colt feeling fine. Farther recovery was uneventful. Before closing, will make mention of another rather peculiar case of cryptorchid castration on a four-year-old that had one testicle removed at one year old.

Dr. Rossiter introduced the entire hand and found nothing of the testicle or cord. Then forcing the arm in to the elbow farther search was made, declaring there must be one somewhere or the gentleman instinct would not be so prominent. He asked me if I ever saw a horse with a floating kidney, for he either had a testicle or kidney, and it was where the kidney should be. Drawing it out, it proved to be a testicle as large as two fists, very soft, and attached by a cord no larger than a lead pencil. The horse made a good recovery, no swelling being present at any time. Campho-phenique was used in this operation.

TENOTOMY IN BOTH POSTERIOR MEMBERS.

By CHAS. A. DOWNEY, M.D.V., WAYCROSS, GA.

The case represented by Cut I. was of two years' standing when presented for advice. Tenotomy was advised and per-



formed. Cut II. shows the condition of the horse and the legs some time after the operation; the horse standing exactly as in



Cut I., with what had been the worst leg to the front of the picture.

A UNIQUE CASE OF LACERATION OF THE SPHINCTER ANI.

By A. B. COOKE, M.D., Nashville, Tenn.

On February 26, 1910, the patient, a boy, seven years old, was brought to St. Thomas Hospital, accompanied by his father and physician. The following remarkable history was related: About noon on the day named the boy who lived on a farm, went out to his favorite place behind the corn-crib to attend to a call of nature. While engaged in the act, a pet dog, a hound of middle size, came up from the rear and mounting him, affected entrance into the anus and became "accoupled." The boy's outcries quickly brought his mother upon the scene. The dog had reversed his position and was in the same relation to the boy as is ordinarily assumed in the natural act with a bitch. The mother's excitement was naturally marked and in her frantic efforts to disentangle the two, she used considerable violence and finally succeeded in separating the dog.

The family physician on his arrival found that the hemorrhage had practically ceased, but upon inspection of the bowel found the parts were badly lacerated and advised the patient's removal to Nashville for treatment.

Dr. Cooke's examination found very little evidence of external injury. Traction upon the anus, however, showed that several internal lacerations of considerable extent were present. Under general anesthesia the deepest of these was found to be in the middle line posteriorly, extending from a point two inches up the rectum through the sphincter muscles, and out upon the skin surface for a distance of approximately one inch. The external sphincter was torn in two places at this site, one tear being complete, and other partial. Anteriorly there was a second laceration into, but not through, the fibers of the sphincter. In addition there was a number of minor tears in the anal margin involving the superficial tissue only.

Fourteen interrupted catgut sutures were used in repairing the posterior laceration, and four in the anterior one. The others did not require suturing. The result was entirely satisfactory. Union was prompt and complete and the patient returned home in two weeks with perfect sphincter control.

The unusual case of sodomy related above was sent to the REVIEW through the courtesy of Dr. Geo. R. White, who states in his letter of transmittal, that Dr. A. B. Cooke is one of their highest class medical men in Nashville and a rectal disease specialist. He closes his letter by saying—"I saw the patient and know all the circumstances related by Dr. Cooke in regard to same."—Ed.

Mary had a little calf,
Whose bawl most bust his throttle;
For the milk that he had ought 'er had
He seen put in a bottle.

—Horn and Hoof.

Dr. W. G. CHRISMAN, State Veterinarian of North Carolina, who occupies the unique position of being secretary to two different State veterinary medical associations at the same time; viz., the North Carolina Veterinary Medical Association and the Virginia State Veterinary Medical Association, speaks of the excellent meetings they have had of both organizations recently, and says of his own State: "The profession in the State seems to be ever advancing. More young men going into the profession annually. Our State holds many inducements for wideawake practitioners."

ARMY VETERINARY DEPARTMENT.

STATUS OF THE ARMY VETERINARY BILL.

Replying to inquiries about the status of the Army Veterinary Bill, we briefly report that S. 1692, "To increase the efficiency of the veterinary service of the Army," passed the Senate on March 9, 1910. It was not taken up for consideration by the Committee on Military Affairs of the House, on account of Chairman Hull's absence from Washington on the political campaign in his home state, which, together with the much-heralded policy of economy practised by Congress, blocked nearly all military legislation.

However, the Army Veterinary Bill does not die with the adjournment of this Congress and will still be pending before the Committee on Military Affairs of the House when Congress reassembles on December 9, 1910, for the short session ending in March, 1911.

Little active work was done in pushing the bill because Chairman Hull early informed Drs. Melvin, Mohler and Turner that there was absolutely no prospect of the measure passing the House at the late session of Congress.

A number of army veterinarians, however, became very uneasy about the bill, foreseeing failure over again, and they started to make propaganda for the bill among the members of the House Military Committee, which, if it had no other effect, disclosed the fact that there really was no opposition to our bill, but rather a sympathetic feeling towards it.

No line of work for the bill has been agreed to for the coming session as far as we know. Chairman Hull has failed to be re-elected and much will depend upon his successor and, perhaps, also, upon the political coloring of the new Representatives elected. One thing is certain, however, that a campaign for the bill will have to be short and decisive if the bill is to be taken up and passed, because the short session is not only limited in time, but has already been divided into days of the week for certain kinds of bills, and precious little time is

left for the consideration of so personal and unimportant a bill as ours is.

Altogether, the sky ahead of us is not bright just now. Changes in the personnel of the General Staff are said to be not favorable for our cause, and we shall be mighty lucky if this belated veterinary bill, limited in its improvement of the army veterinary service as it is, will finally be passed by Congress. If not, we may even witness a reaction from what little we have gained since 1899, not to speak of a hope for a commission and a Veterinary Corps, the outlook of which is frustrated for years to come. Verily, we are taking a slow course in evolution under guidance of Father Time.

O. S.

ARMY VETERINARY PERSONALS.—Nearly all the army veterinarians are in the field practising in annual marches and maneuvers. At Leon Springs, Texas, a veterinary field hospital has been established and Dr. Fred Gage, 3d Field Artillery, is in charge of it. This is a new venture, inaugurated at the Texas maneuvers in 1908, and has proven a decided success.

Dr. Aquila Mitchell, 3d Cavalry, has officially forwarded a report on the investigations he made of "horse-dying" in Tlahualilo, State of Durango, Republic of Mexico, whither he was sent by our War Department. The disease proved to be forage-poisoning, infectious cerebro-spinal meningitis. The report is concise, but clear and interesting.

O. S.

DANGER IN FEEDING ROOTS.—Stockmen have long been of the opinion that a ration of mangels or sugar beets in some way causes kidney or bladder stones when fed for any length of time. To shed some light on this subject the Iowa Experiment Station has been carrying on some experiments in feeding mangels and sugar beets to rams. The results of these experiments show conclusively that such feeding is attended with considerable danger, and is almost sure to prove fatal if continued for any considerable period of time. For short fattening periods there is no particular danger, and the root makes a valuable addition to the ration. A full account of the experiments is given in Bulletin No. 112, which may be obtained free by writing to Chas. F. Curtiss, Director Iowa Experiment Station, Ames, Iowa.

ABSTRACTS FROM EXCHANGES.

ENGLISH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

ILEO-COECAL INTUSSUSCEPTION IN A BITCH [*A. W. Noel Pillers and H. Thompson*].—A seven-months-old spaniel bitch is reported as having passed blood-stained feces several times, had no appetite and vomited. She, however, presents nothing very abnormal and after a little watching, she is sent home. Several days later she is reported to be in the same condition, and that the feces are abnormally soft, yellow and occasionally stained with blood. She strains much and has lost considerable flesh. She assumes peculiar resting positions; in one she stretches out with fore limbs horizontal and the hinds vertical, as begging in a corner. Or again the head would be placed across the loins and the bitch would jump out of her box to assume the former position. On careful examination and palpation of the body, a large mass is made out extending from the stomach to the umbilicus. By the rectum a fleshy body is detected. Intussusception with adhesions is diagnosed. After all minute antiseptic preparations, "laparotomy was performed over the enlarged mass and that portion nearest the rectum was lifted into the wound. Great changes had been expected to be found in the bowel but they were only a little injected, thicker and harder than normal. Gentle pressure soon caused the ileum to return along the colon, until the hardened in-turned portion of the ileum, near the cæcum was reached. This being hardened by inflammation, cracked under gentle pressure. Three fine sutures were inserted. Between eight and ten inches of ileum were inside of the colon. The bowel was returned and the wound closed." Milk and barley water diet was allowed. A slight complication with temporary elevation of temperature took place, but the little patient recovered well after a comparatively short time.—(*Veter. News.*)

IRREDUCIBLE INTUSSUSCEPTION — OPERATION — RECOVERY [*Prof. H. A. Woodruff*].—Black and white cocker spaniel, six

years old, has always been in good health. One day she passed blood per rectum. She had no vomiting, no pain on the abdomen. She received proper treatment and was relieved. Several days after, however, she is again taken in the same way, and by careful examination of the abdomen an intestinal obstruction extending back from the ribs was felt just within the rectum. It is a long cylindrical swelling which presented this peculiarity that is felt at one moment, at another only a hard nodule as large as a hen's egg could be found. Opening the abdomen under chloroform gave an explanation. An intussusception eight inches long of the large intestine was found, and quite easily reduced, as there was no adhesion. During the process of reducing it, a second intussusception was detected of the entire cæcum into the colon. This was treated as follows: "It was decided to amputate the piece of bowel involved, consisting of a short piece of small intestine, the cœcum and a short piece of colon, in all eight inches of intestine. The vessels of the mesentery were ligated and the large bowels were ringed around by an incision through the serous and muscular coats, leaving the mucus intact. The serous and muscular coats were split, reflected from the mucus and then cut through. Thus a tube of large intestine was left, of which a part was denuded of mucous membrane and had a raw internal surface. Into this tube the small intestine was inserted and the large tube stitched round the smaller with fine silk. The abdomen was closed in the ordinary way. Milk diet for the first week. Soft diet the second. Feces passed off the third day. Wound healed without complications."—(*Veter. News.*)

HAIR-PIN IN THE OESOPHAGUS [*E. Wallis Hoare, F.R.C.V.S.*].—A greyhound puppy has some twine hanging from the mouth. Although it is pulled out, the dog acts as if he has something in the throat. By external manipulations, a short distance from the pharynx a foreign body is detected. On the right side it is blunt, on the left it is sharp. It is situated right across in a transverse position. Manipulations are very painful. An incision is made on the blunt end on the right side, the foreign body is extracted with bone forceps. It was a hair-pin whose ends were bent on each other. Recovery followed without trouble.—(*Veter. Rec.*)

MUMMIFIED FOETUS [*M.R.C.V.S.*].—Three-year-old heifer had been served and when normal period of gestation ended, she

showed no indications for parturition. She remained healthy. Examined by the author he found the vulva much wrinkled, and the introduction of the hand in the vagina was impossible. Rectal examination was negative. The animal was slaughtered. A foetus was found in the uterus. It measured seven inches in length and was surrounded by its envelops. The uterine walls were thickened. The cow had been served only once and that twenty-three months before being killed.—(*Ibidem.*)

IMPACTION OF THE DOUBLE COLON SUCCEEDED BY RUPTURE [*E. Wallis Hoare, F.R.C.V.S.*].—Seven-year-old cart gelding had an ordinary attack of colic, which was treated by the stableman. The next day the colic returned rather acutely. Chloral and linseed oil gave temporary relief only, when eserine sulfate was injected. Small amount of hard feces were passed. The animal sat on his haunches and was in great pain. This condition lasted for several days, chloral, arecoline, eserine, enemas being given without any effect. After an illness of fourteen days death took place. Autopsy: Acute diffuse peritonitis, fluid in the abdomen mixed with intestinal contents. “The contents of the double colon in the first division was fluid, in the third there was a small rupture. The fourth division was enormously distended with food and had a large rupture not involving the mucous coat. Floating colon was empty.”—(*Ibidem.*)

ACUTE ENTERITIS [*Same Author*].—An aged thoroughbred mare had foaled two weeks previous. She has colic one morning. Gets a dose of chlorodyne. She is bad again in the evening having violent pains, lying on her side, sometimes on her back with head turned sideways, when she seems to get some relief. At times she would depress her head and carry one fore foot over the nose. There was slight tympanitis. The mucous membranes were injected, the pulse quick and weak, the respiration accelerated. She received chlorodyne, chloral, morphia. She died. Autopsy: Acute hemorrhagic enteritis of the double colon, ingesta stained more or less with blood.—(*Veter. Record.*)

VALVULAR DISEASE WITH DILATATION [*Major W. R. Walker, A.V.A.*].—Aged eight years, this black gelding always worked well and has never been sick. One morning he is found lying down and is making violent efforts to get up. He is then taken to a loose box where he lays down immediately for an

hour, struggled some and died. At post mortem the heart is found hypertrophied, especially on the right side, where the auricle is twice the normal size. Its fleshy walls are flabby and easily torn. The valves were much thickened, especially the tricuspid. The heart weighed 10 pounds. All the other organs were healthy.—(*Veter. Journ.*)

TETANUS IN A DOG [*J. Stewart Wood, M.R.C.V.S.*].—Male fox terrier, about eight years old, had ticks on his back which were removed with spirits of turpentine. The dog rolled himself afterwards in a garden. Some days later he gradually became stiff and soon undoubted signs of tetanus were present. Head raised, spine depressed, legs stretched out, a typical opisthotonus. As experiment he was put under chloroform, but as soon as its effects had subsided, the symptoms returned. Death took place three days after.—(*Veter. Journ.*)

SARCOMA OF THE FEMUR IN A MASTIFF [*Prof. G. H. Woolridge, F.R.C.V.S.*].—This dog was seven years old. He had been lame on one hind leg some time previous, but had recovered. However, he now and then had short relapses. Finally he became quite lame, but this passed off by exercise. Rheumatism was suspected. When the writer saw him he had an enlargement at the junction of the middle and lower thirds of the femur. It was tense and painful. Ostitis was diagnosed and local applications of iodine prescribed without satisfaction. The swelling became softer, the lameness and pain increased, and the dog was chloroformed. The examination of the leg revealed the nature of the enlargement (round-celled sarcoma), with destruction of the bone and extensive periostitis of the remaining portion.—(*Veter. Journ.*)

FRENCH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

CYSTIC FIBRO-MYOMA OF AN UTERINE HORN IN A CAT—LAPAROTOMY—SUB-TOTAL ABDOMINAL HYSTERECTOMY—RECOVERY [*Dr. Richard*].—When six years old, this animal was intoxicated by licking zinc ointment. She recovered and with this exception has always been healthy. She is nine years old

and lately has lost her appetite and flesh, while her abdomen has grown larger. A veterinarian consulted thought she was pregnant, but as she had very good habits, this was considered impossible by the owner. Then perhaps she has chronic peritonitis. To settle the question, radioscopy is resorted to and both suppositions are excluded. A few days later, greenish and very thick pus is observed on a spot where the cat had laid down. This contained streptococci and staphylococci in great quantity, with also a few bacilli, leucocytes and pus corpuscles. A closer examination brings out a final diagnosis of abdominal tumor of the uterus or its annexes and an operation is decided. The cat was anesthetized with chloroform 1 part and ether 2, and with the greatest of care anesthesia obtained. The parts were thoroughly disinfected and the abdomen opened with an incision extending from the umbilicus to the anterior border of the pubis. A small quantity of peritoneal fluid escaped, and a large tumor not adherent to the left uterine horn was exposed and isolated. The uterus and horns were removed with the tumor. The after care was very minutious as the animal had spells of syncope and had to receive caffeine and hyoscyanine. Towards the fourth day the animal began to take food. The improvement continued on the 5th and 6th, and on the 7th the dressing was taken off and also the straight jacket in which it had been necessary to put the animal to prevent him scratching the dressing off. Recovery and union were complete about the twelfth day. The examination of the tumor showed it to be a cystic fibro-myoma.—(*Bullet. Societ. Centr.*)

JAUNDICE FOLLOWING CASTRATION IN THE HORSE [A. Bouquet].—The author has castrated some 500 or 600 horses, and with exception of two fatal cases of septicemia, he has had no reason to complain of the results he has obtained with his mode of operating, viz., disinfection of the scrotum, with tincture of iodine, operation by covered testicles one or two injections of anti-tetanic serum. His horse resumed work after the ninth or tenth day with a complete cicatrization of the wound towards the fifth or sixth week.

He has, however, observed, say, seven or eight times in a year, principally in horses that had been castrated seven or eight weeks before, symptoms of jaundice, more or less serious, receding rapidly by proper treatment, but in some rare cases accompanied with manifestations of cerebral excitement as in meningo-

encephalitis. With proper treatment of cold applications on the head, injections of pilocarpine and cold water enemas, recovery is, however, the rule. The author inquires whether or no there can be relation of cause to effect in those accidents of jaundice, as such he has never noticed in stallions or in mares.—(*Rec. de Medec. Veter.*)

STIFF NECK OR CERVICAL MYOSITIS IN DOG [*A. Videlier, Army Veterinarian*].—This trouble is frequent in long haired water animals, in dogs hunting in ponds, marshes, etc. The symptoms have an apparent severity. The dog holds his head stretched forward and the pain due to any movements of the head gives rise to great howlings. The animal is afraid of moving and in fear of any one touching him. Rather than lie down, he often prefers standing, resting his head if possible on a chair. Although the fever may be rather slight, the dog refuses food because of fear of pain in moving his jaws. The author relates a case in which one of his dogs suffered terribly a whole day. Castor oil and frictions of emetic ointment on the neck brought an improvement the next day and in forty-eight hours the dog was well. As in some cases the pain manifested by the animal might suggest the possibility of meningitis, it will be prudent for young practitioners to bear in mind the possibility of a sudden appearance of acute localized myositis which may also be very painful.—(*Rec. de Medec. Veter.*)

INTESTINAL INVAGINATION IN FOWLS [*J. Guittard*].—Such intestinal lesions are not recorded in any work relating to diseases of fowls. The writer has observed one case which he relates as follows: "This bird was sick for several days. The previous history is not known. Since three days that she is in the flock she has not eaten anything and she is killed. After being feathered, her carcass appears very thin, evidence of a sickness of long standing. The crop is enormously filled. On opening the abdomen the small intestine is found much dilated of a brown color and full of liquid excrement. The dilatation is limited and stopped suddenly at a hard portion. Then comes the caeca and the rectum. The remains of the intestines are empty except for a little grey substance. The hard portion is incised and all the characters of the invagination are exposed, with the three coats of the intestines. The first and second layers, mucus against mucus, are easily separated, but the second and third lined by

the serous membrane are adherent, and finally the internal wall of the third coat lined by the mucous membrane is filled with mucus mixed with feces.—(*Prog. Veter.*)

TEARING OF THE GREAT POSTERIOR STRAIGHT MUSCLE OF THE HEAD IN SUCKING CALVES [Same Author].—An accident that can take place, when the calf is taken away with force from his mother while he is sucking. What may then occur? says the author. A seven-months-old calf is suddenly showing signs of general locomotor ataxia. Yet if placed in a standing position on his hind legs, he holds well on them and with his fore in good position. But if he is not supported, he staggers, carries his head to the right and finally drops on the ground. Lying down, and he always does it on the right side, he holds his head backwards. His appetite is good and rumination normal. Congestion of the brain is suspected. Bleeding and cold water on the head are resorted to, and after a few days the animal is slaughtered. At the autopsy a clot of blood already organized will be found back of the axis corresponding to the origin of the great posterior straight muscle, as the writer has found it in the case recorded above. This is an accident which deserves attention.—(*Prog. Veter.*)

RARE CASE OF SERO-FIBRINOUS PERDICARDITIS IN THE HORSE [Prof. Leblanc and Mr. Reibel].—This mare is between 18 and 20 years old and for some time she has been suspected of suffering with pericarditis. One day she is found lying down and unable to get up. She has a large swelling under the chest and abdomen; her pulse is strong and the artery full. By percussion of the chest, a zone of dullness extends in the cardiac region between the third and sixth ribs. It reaches about half way in the thorax. Auscultation is negative. Pericarditis with exudation is diagnosed. The animal dies after a few days. At the post mortem, a quite abundant quantity of fluid was found in the pericardium, with the parietal layer considerably thickened and united to the visceral layer by numerous thick dark yellow false membranes.—(*Bullet. Soc. Scien. Veter., Lyon.*)

PRIMITIVE SARCOMA OF THE KIDNEY GENERALIZED TO THE LUNGS IN A DOG [Mr. Antonio, Maja].—Four years old, this dog presented all the ordinary clinical signs of gastro-enteritis and also of ulcerated stomatitis with caries of the inferior jaw. Be-

sides those, in exploring the abdominal cavity the presence of a large tumor was detected. Notwithstanding great care the condition grew worse and the dog died. At the post mortem, the ordinary lesions of gastro-enteritis were made out, but the condition of the left kidney attracted principally the attention. This organ is enormous, and recognized only by the ureter that rises from it. It is transformed into a voluminous mass, as big as the fist of a man, irregularly bosselated, and having on its surface large blood vessels. Not adherent to the surrounding tissues it is easily removed. It then appears as a neoplastic transformation of almost the entire kidney. Yellowish in color, it is soft in consistency and looks like adipose tissue. It is composed of three masses, all connected into one by the renal capsule. The other kidney is healthy. In the lungs there are metastatic centers, in small number and of small size, say about an hazel nut. Their characters resemble those of the renal tumor. All by their macroscopic and microscopic examination revealed their true nature, a *Globo-Cellular Sarcoma*.—(*Bullet. Socie. Cent.*)

A CASE OF ESOPHAGEAL JABOT IN A DOG [*Mr. Renou, Army Veterinarian*].—After making violent efforts of deglutition, a low bred dog swallowed a large sized piece of meat. Since, he always has trouble in deglutition. This has increased considerably and the dog after several months of misery is in a perfect state of marasmus. In very poor condition, he is stiff and sore all over, his back is arched and his chest dilated. He walks in making short steps. When he takes solid food, the repeated efforts he makes to swallow are brought out. Notwithstanding a special regime, which was made to allow easier deglutition the condition grew worse and the animal was destroyed. At the post mortem, a tumor as big as the fist of a man is found in the thorax; covered by the lungs, it is formed of fibro-lardaceous thick tissue. It is a cavity full with pieces of bone mixed with whitish fluid and communicating with the cavity of the oesophagus by a long slit. There were no indications of parasitism and it is probable that when the dog swallowed the large piece of meat, several months before, the muscular coat of the oesophagus gave away and the mucous membrane formed a hernia with the jabot as a consequence.—(*Rec. Medec. Veter.*)

CURIOS LESIONS OF THE SPLEEN IN A HORSE [*Mr. Ragneau, Army Veterinarian*].—This young horse has been laid up

on various occasions for ailments which, relieved by treatment, had never been positively diagnosed. Submitted to special diet he improved, but as soon as he resumed his ordinary feeding, the troubles returned again, varying in intensity and duration. He finally died. At the autopsy there were found 15 litres of sero-bloody liquid in the abdomen with diffused peritonitis. Running across the abdominal cavity, from one side to the other, there was a tumor, formed by the spleen, having a quadrangular pyramidal shape with the base turned to the left side. It passed round the great curvature of the colon and pressed on the liver. This hypertrophied organ measured 87 centimeters in length, 35 at the base, and weighed 15 kilogs. and 700 grammes. Towards the lower border, the duodenum passed through it and is so squeezed that its cavity is closed. The antero-superior angle is occupied by a cavity containing two litres of pus. Sections of the organ revealed the presence of caseous and hemorrhagic places from which oozes a liquid analogous to cancerous juice. Unfortunately no microscopical examination was made to determine the nature of this growth or even the origin.—(*Ibidem.*)

ABSCESS OF STRANGLES IN THE MEDIASTINUM COMMUNICATING WITH A SUB-STERNAL PURULENT COLLECTION [Mr. Renaud and Dr. Drouet, Army Veterinarians].—A recently bought colt of four years had a rather severe attack of strangles. This is complicated with sub-glossal adenitis and formation of several abscesses under the throat and in the parotid region. These were treated as similar troubles are. Much reduced in flesh and weakened by his sickness, the horse at last seemed to enter in his convalescence when there appeared under the sternum in the region of the girth, a warm painful and well-defined swelling, which kept spreading, grew bigger and assumed the aspect of one following an application of mustard poultice. The horse did not seem to mind it and yet the elevation of his temperature suggested the idea of the formation of a deep abscess somewhere. Finding a soft spot fluctuating on this swelling, it was tapped with a trocar; only a few drops of pus escaped. Another puncture with the actual cautery gave grumelous pus, having peculiar odor and not looking like pus of strangles. The temperature kept going up and soon symptoms of double pleurisy made their appearance. Notwithstanding thoracenthesis, the horse died four days after. In opening the thorax, there was found on the left side a large quantity of pleuritic fluid. The layers of the

pleura were covered with thick exudates. The left lung was congested. In front of the pericardium and adhering to it, there is a purulent pouch with fibrous walls, as big as a man's head and filled with pus in process of caseification. This abscess was communicating by several fistulous tracts with the sternal collection. On the right side similar lesions were found. The pericardium was normal; the heart but slightly hypertrophied.—(*Rev. Gener. Medec. Veter.*)

ITALIAN REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

THROMBOSIS OF THE AXILLARY ARTERY [*Dr. F. Quadrelli*].—A seven-year-old horse has an intermittent lameness of the left fore leg. When the horse is in the stable, he keeps it in full extension. Walking is normal. It requires a trot of 100 or 200 meters to have the lameness manifested. The horse starts free from any irregularity in his actions. At first no definite diagnosis was made and all kinds of treatment were resorted to. Later, the author noticed that the leg was apparently cooler than the other, and also that the pulsations of the collateral artery of the fetlock were more difficult to detect. He concluded that the horse had thrombosis of the axillary artery. The animal died shortly afterwards from myocarditis according to the post mortem made by another veterinarian. But Quadrelli thinks that this is an error and that there was only an hypertrophy without any inflammatory character, which was due to the difficulty in the circulation by the lesion of the axillary artery.—(*La Clin. Veter.*)

A CASE OF QUINTUPLE PREGNANCY [*Dr. Gio Batta Dalan*]. This was observed at a slaughter house where a cow had been killed. She had had an enormously distended abdomen, principally on the right side. The trouble was such that the animal could scarcely walk or stand up on her legs. The history was that she had only shown that condition since a few hours, that the cow was pregnant and expected to calve in about one month, but that fearing by her condition that she might not reach her whole time, the owner had decided to have her killed.

At the examination of the large developed uterus five calves, three males and two females, were found, varying in weight between 15 and 19 kilogrammes and altogether 79 kilogrammes. They were comparatively normally developed, living and in good condition. Taking in consideration their size, and the distended dimensions of the abdomen, it is very doubtful if the cow would have been able to reach the normal date of the end of her pregnancy without some serious and probably fatal complication.—(*La Clin. Veter.*)

CONTRIBUTION TO THE STUDY OF IMMUNIZATION AGAINST NAGANA IN DOGS [A. Lanfranchi].—The various attempts of immunization against trypanosomiasis have to this day been unsatisfactory, although those of Koch have shown, however, that attenuation of the virus may be better than sero-immunization. After observing that the spleen has a high trypanolytic power, the author thought that if the virus of nagana directly inoculated in splenic tissue would sustain a certain amount of attenuation, it might be possible by several passages in series to obtain a certain degree of immunity. A dog is inoculated in the spleen with 0.5 gramme of guinea pig blood rich in parasites. He dies in 104 days. An animal of control inoculated in the peritoneum dies towards the fifth day, which is about the ordinary length of time. Another dog is inoculated in the spleen with 0.5 gramme of blood from the first dog. For fourteen days the blood of this dog shows no trypanosomes. He then received under the skin 0.5 gramme of blood, rich in parasites, obtained from a witness. Eight days later there is no trypanosome yet in his blood. He is inoculated again in the peritoneum with blood rich in parasites, and it is only after fifteen days that trypanosomes are found in small number in his blood. From these experiments, it appears that: 1. The virus of nagana is attenuated by its injection in the spleen. 2. That by successive passages through the spleen of the virus thus modified, a relative immunity can be obtained in dogs against virus taken from dog or guinea pigs.—(*La Clin. Veter.*)

UPON THE VALUE OF THE ANTIADENITIC VACCINATION [Dr. Plinio Carlo Bardelli].—The author records the results he has obtained in five vaccinations that he has made with the vaccine prepared by the Cabinet of Bacteriology of Military Veterinary

Medicine. In the first where an outbreak of equine adenitis (strangles) has taken place among fifteen young horses, he inoculated eleven and after, without any local or general reactions on the part of the animals, he had no more trouble among them. In a second, where out of twenty-one horses, about half had intermaxillary adenitis, the remaining sound ones were inoculated and remained free from the disease. In a third and fourth instance, twenty-three animals were also vaccinated. Five of them only manifested very mild disease afterward, and in a fifth when eighteen horses having become diseased with quite a severe attack, some fourteen animals that remained were then vaccinated and escaped all trouble. The conclusions of the author are that 61 animals were submitted to this anti-adenitic vaccination and that only five after the operation presented very mild form of the disease, consequently these experiments proved that the vaccine possesses of efficacious qualities and that having given good results, it deserves to be used.—(*Il Nuovo Ercol.*)

CHONDROMA BY FOREIGN BODY IN A SWINE [Dr. Ottorino Mancinelli].—Consulted for a sow that had a swelling on the upper part of the right shoulder, about the size of a large orange, rather crepitating to the touch, warm and painful, a diagnosis was made of some neoformation due to traumatic cause and applications of iodo-iodurated ointment were prescribed. This treatment was followed for about a month without giving any satisfactory results and removal of the tumor was requested by the owner. The animal was cast, secured, the parts thoroughly disinfected and after careful incision of the skin, subcutaneous aponeurosis and muscles, the growth was isolated from the bone and cartilage to which it was more or less intimately attached and finally removed. The edges of the cavity were brought together and dressing with sublimate solutions prescribed. In due time, the parts healed without complications.

In the examination that was made of the tumor by incision of its mass, the scalpel arrived in the center of a cartilaginous deposit where a hard body was found. It consisted of a piece of upholsterer needle, about three inches long and very sharp at its end. It is supposed that this had dropped into the bedding of the animal, vertically and with the sharp end turned upwards, thus facilitating its entrance through the skin, and deeper when the animal laid on it.—(*Il Nuov. Ercol.*)

GERMAN REVIEW.

By JOHN P. O'LEARY, V.M.D., BUFFALO, N. Y.

CONTRIBUTION TO THE PATHOGENY AND TREATMENT OF CALVING FEVER (MILK FEVER) [Bredo].—The author is of the opinion that milk fever, with its train of very rapid non-febrile symptoms, paresis of the hind quarters, paralysis of the extremities, general paralysis, great prostration, insensibility, is a hypo-seroæmia, that is to say, a general acute progressive anaemia with diminution of the serum of the blood (in quantity) a draining of the aqueous elements of the latter and which results from the physiological congestion of the udder and the activity of that gland at the setting in of lactation. The designation calving fever (milk fever) is, according to the opinion of the author, not well chosen as the malady is purely paralytic in form and not a feverish condition, and it appears, too, at times other than the result of parturition. When the disease attacks cows at time of calving then we ought to call it paralysis, or, better still, calving-hypo-seroæmia. If it is a sequel to a severe diarrhoea, then we should name it intestinal hypo-seroæmia. The appellation hypo-seroæmia is better adapted to this disease because the symptoms of milk fever coincide with those of acute anaemia as they indicate an intense uterine or intra-abdominal hyperæmia. These symptoms are a weak, rapid, thready pulse, bloodless arteries, accelerated heart beat, mucous membranes slightly pallid, absence of fever, progressive weakness, twitchings, coma and death. In many cases weak fainting spells are observed in which the animal dies very suddenly. The lack of perceptible lesions at the autopsy, together with the diminution in the total quantity of blood are all facts which support the theory of the author in one accord. The physiological congestion of the udder and the consequent lactation produce a considerable diminution in the quantity of blood. In the beginning the equilibrium is re-established by the contraction of the uterus, absorption of the digestive fluids and resorption of the tissue fluids into the blood. When, however, the amount of water and moist feed is not sufficient, the symptoms of hypo-seroæmia appear. Blood letting in this condition accelerates a general anaemia and aggravates the disease, as the author had already observed in many instances. In order to confirm his theory Bredo refers his readers to the following clinical observations. Hypo-seroæmia

appears usually to attack good milch cows, and generally after calving, in which case the amount of serum in the blood is considerably decreased by the sudden onset of lactation. The disease, as a rule, appears more frequently among fat cows than lean ones, because the amount of blood in the former is proportionately less body weight than in the case of the latter. After a difficult birth, in which case the animals are usually sick, the disease never presents itself because such cows give very little milk and as a result of their feverish condition drink large quantities of water, while, on the other hand, fat cows which are heavy eaters and have been dry for some time before calving, and are good milkers, easily fall victims to the disease. In the case of those animals which yield a large flow of milk a sudden depletion of the watery elements of the blood takes place. It may also occur in such animals before calving when milk secretion has already set in. When thirst is aroused in those animals by the administration of medicinal agents, the disease appears gradually and less severe or perhaps not at all. When the animals are milked frequently the disease is intensified because milk secretion is increased and the serum is absorbed by the empty, milked udder. When a copious injection of a physiological salt solution is made hypodermatically or intravenously, or rectal injections of 15 to 20 litres of lukewarm, normal salt solution, the disease does not appear, or if it has already attacked the animal, a rapid recovery ensues. This is also the case when the udder is injected with solutions or gases which mechanically prevent milk secretion, because on the one hand the blood or the lymph is forced back from the surcharged udder into the general circulation and, on the other hand, through the cessation of milk secretion the blood is not robbed of its watery elements. Animals which have not yet given milk do not contract the disease, provided no other cause produces a sudden depletion of the blood serum; for instance, a severe diarrhoea following the action of a purgative, or it may be brought about by an inflammation of the bowels. It does not affect good milch cows which suffer from an inflammation of the udder, nor those which are given water to drink freely. The author now endeavors to refute the theories advanced up to the present moment concerning the etiology of milk fever, as follows:

1. Cerebral anaemia, the result of increased activity of the portal circulation (Aronsohn, Zehl, Meyer). This theory cannot be correct, for the blood which is repelled by contraction of

the uterus into the general circulation compensates a possible existing disturbance present in the circulation of the blood.

2. Cerebral anaemia as a result of a pathological hyperaemia of the udder. An inflammation of the udder is not present, if it were, the first symptoms to be observed would be a hypo or agalactia.

3. Non-infectious toxæmia which arises from a progressive auto-intoxication due to a retrogressive metabolic change in the mammary cells. If this were true the milk must also be poisonous, which is certainly not the case. Again, when milking occurs several times daily the toxic material would be removed and recovery follow much more rapidly. Clinically, this is just the very opposite, as it is the best means of accelerating the development of the disease. This theory would not explain the appearance of the malady in oxen as was reported by Frank, or in yearling bulls as the author had observed personally.

4. Formation of toxines in the udder, the enzymes, which for the most part are similar to the trypsins, the pepsins and so on (De Vries). These theories are based upon the same suppositions as the former and are set aside by the same arguments of the author.

5. Infection of the udder by anaerobic organisms, a theory which is supported upon the curing of the disease by intra-mammary injections of oxygen peroxide. Against this we answer that a gas, free from oxygen, injected at the proper time gives equally good results.

6. Infection from the uterus (Frocard). The conditions submitted as to a normal birth having taken place in which no injuries have resulted does not support this theory. The victims of milk fever are strong, well-nourished animals which are capable of resisting infection to a large extent, together with the fact that there is no fever present. The rapid recovery, and that without a convalescing stage after the action of air in the udder, is not observed in cases of infection. Therapy, although the preventive as well as the curative treatment should be always borne in mind. The blood circulation should be re-established to an equilibrium when interrupted. A medium-sized cow, according to Boussingalt, gives off daily 33 litres of water through the skin and respiratory tract and 15 litres through the urine and excrement, besides that which is secreted in the milk. One should therefore give a cow, which had just calved, water in sufficient quantities and not milk the animal for at least 24

hours after calving. Also the stall floor should be constantly sprinkled with water in order to keep the air well saturated with moisture and minimize the evaporation of fluids from the animal economy. If the patient is not inclined to drink, the desire for liquids may be aroused by administering alkaline remedies, sodium chloride in solution, or bicarbonate of soda and so on. When the disease has already developed we should have recourse at once to intramammary infusions of air in order, by mechanical means, to drive the blood back into the general circulation. Also administer intra-uterine and intra-abdominal irrigations and subcutaneous injections.—(*Berliner Tier, Wochenschrift*, No. 21, 1910.)

DR. W. W. YARD has been appointed Aide on the Staff of General Sherman Bell, who is Grand Marshal for the Spanish War Veterans' Roosevelt Parade and Encampment at Denver, Colo., August 29, 30, and 31, 1910.

THE PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION will hold its semi-annual meeting on September 20th in the Y. M. C. A. rooms, Second and Locust streets, Harrisburg, Pa. This splendid State organization always gives those in attendance a literary feast, such as is presented at few State associations. All who can possibly do so should be present to partake of it.

TROTTING IN SEPTEMBER, 1910—September 6 to 10: Hartford, Conn.; Dongan Hills, S. I.; Orangeburg, N. Y.; Hamburg, N. Y.; Rutland, Vt.; Potsdam, N. Y.; Bethlehem, Pa.; Timonium, Md.; Minneapolis, Minn.; Liberty, Ill. September 12 to 16: Syracuse, N. Y.; White Plains, N. Y.; Albion, N. Y.; Riverhead, N. Y.; Little Valley, N. Y.; Johnstown, Pa.; Brookville, Pa.; Baltimore, Md.; Wheeling, W. Va.; St. Johnsbury, Vt.; Milwaukee, Wis.; Grand Rapids, Mich. September 19 to 23: Columbus, Ohio; Mineola, N. Y.; Ogdensburg, N. Y.; Batavia, N. Y.; White River Junction, Vt.; Rockville, Conn.; Allentown, Pa.; Parkersburg, W. Va.; Detroit, Mich. September 26 to 30: Columbus, Ohio; Trenton, N. J.; Berlin, Conn.

The horse game is not yet dead!

CORRESPONDENCE.

DIVISION OF VETERINARY MEDICINE, IOWA STATE COLLEGE,
Office of The Dean, Charles H. Stange.

AMES, IOWA, August 8, 1910.

AMERICAN VETERINARY REVIEW, 509 West 152d Street, New York City.

GENTLEMEN—On page 686 of your August number there is a report concerning the manufacture of hog cholera serum in the State of Iowa stating that it was to be furnished free to stock raisers and that it must be administered by a competent veterinarian. I am interested in this report because as experiment station veterinarian I have received numerous inquiries regarding the use of hog cholera serum, etc. It is possible that there was some mistake in this report, but at any rate it seems that it should be corrected; consequently I am enclosing a copy taken from the laws of Iowa, Thirty-third General Assembly, which I think will be self-explanatory.

Very truly yours,

C. H. STANGE.

CHAPTER 151.

ESTABLISHMENT OF LABORATORY FOR MANUFACTURE OF HOG CHOLERA SERUM.

AN ACT to establish a laboratory for the manufacture of hog cholera serum at or near Des Moines under the supervision of the state veterinary surgeon and make an appropriation therefor. (Additional to chapter fourteen (14) of title twelve (XII.) of the code, relating to state veterinary surgeon.)

Be it enacted by the General Assembly of the State of Iowa:

SECTION I. ESTABLISHMENT AUTHORIZED—ASSISTANTS—SERUM, HOW SOLD—RECEIPTS, HOW EXPENDED—APPROPRIATION. The state veterinary surgeon is hereby authorized to establish a laboratory for the manufacture of hog cholera serum, and to provide the necessary equipment therefor at or near Des Moines, Iowa. The state veterinary surgeon shall be director of said laboratory. He shall employ such assistants as he may deem necessary to carry on said work. The director of the laboratory with the approval of the executive council shall fix the salaries of the employees connected with the manufacture of said serum. Upon application made to the director of the laboratory, he shall furnish said serum for use within the state of Iowa at actual cost of manufacture, and shall also furnish applicants with instructions for the use of same. If said applicant should require the services

of the state veterinary surgeon or his assistants, the expenses for their services rendered shall be paid by the applicant to the director of the laboratory or his authorized assistant. The receipts from the sale of serum and from salvage shall be used by the director of the laboratory to promote the work, and he shall file with the executive council a separate official and itemized statement of all such receipts and expenditures in lieu of turning such receipts into the state treasury, as provided in section one hundred seventy-d (170-d) of the supplement of the code, 1907. The director of the laboratory shall issue receipts for all moneys received by him and shall annually file with the executive council a complete statement of all moneys received by him or expended in the equipping and conducting of said business. Upon passage and publication of this act there shall be made immediately available an appropriation out of any moneys in the state treasury not otherwise appropriated, the sum of eight thousand dollars (\$8,000) or so much thereof as may be necessary to carry out the provisions of this act. The amount above mentioned shall be paid upon the order of the director of the laboratory upon approval by the executive council.

Approved April 12, A. D. 1909.

OBITUARY.

T. G. DUFF, V.S.

Dr. T. G. Duff died at his home, St. Louis, Mich., on April 28, last, in his fifty-second year, after a second stroke of paralysis, both strokes having occurred within a month. Dr. Duff was a Canadian, having been born at Clover Hill, Ontario, in 1858. He graduated from the Ontario Veterinary College in 1885, and, after practising for a short time at Kincardin, where he met and married Miss Lizzie Crawford, he located in the city in which he died. He had a large circle of friends and enjoyed a good practice. He was an earnest and faithful member of the Michigan State Veterinary Medical Association, and was its representative at the A. V. M. A. in Chicago last September. He is survived by a widow, two daughters, a sister and two brothers —one of the latter being the Hon. J. S. Duff, Minister of Agriculture, Province of Ontario; the other, R. A. Duff, a resident of Cookstown, Ontario.

DR. CHARLES WARRENER.

We regret to learn through his sister that Dr. Charles Warrener, of Portsmouth, Ohio, died on March 23, last. The doctor's many friends deplore his loss from their midst.

SOCIETY MEETINGS.

WISCONSIN SOCIETY OF VETERINARY GRADUATES.

The Twenty-first Semi-annual Meeting of this society was called to order at Fond du Lac, July 19, 1910, at 1.30 p. m., in the New Erving Hotel, by President Forge.

Address of Welcome, Mayor Clark. Response, Dr. D. B. Clark, State Veterinarian.

Roll call found a larger number of members present than at any previous semi-annual meeting of the society.

Minutes of the previous meeting read and adopted.

The secretary's and treasurer's reports were deferred until the annual meeting.

Dr. B. F. Holmes argued relative to the inspection of cattle shipped from the states into the Dominion of Canada, criticizing some of the recent rulings as to who should inspect the same.

Dr. D. B. Clark related the Canadian laws controlling importation, also of several of the states, which seemed to make this subject clear to many of the members.

Dr. C. A. Deadman moved that the secretary be instructed to write to Dr. Melvin, Chief of the Bureau of Animal Industry, and Dr. Rutherford, of Canada, and ask them for reasons why any reliable graduate veterinarian whose tests would be accepted by the official in charge, would not be accepted by the Canadian government. Motion carried.

Nine applications for membership were received and referred to the censors to be reported upon at the evening session. The censors reported favorably upon the applications, and upon motion of Dr. Arpke, the rules were suspended and the parties were voted into the society collectively.

Reports of Committees.—On Veterinary Science, Dr. R. S. Heer; on Veterinary Surgery, Dr. J. F. Roub; on Veterinary Medicine, Dr. H. A. Arpke; on Legislation, Dr. D. B. Clark.

Reading of Papers.—Dr. W. G. Clark favored the society with a paper on "Urethral Calculus," a very instructive paper

written from a case of the doctor's own experience, which brought out much discussion, and the essayist received a vote of thanks.

Dr. G. J. Brossard rendered a valuable paper on "Parturient Apoplexy," citing many cases which were out of the ordinary. The paper was well defended by the essayist in the arguments which followed, and the doctor received a vote of thanks.

Dr. G. G. Adams read an instructive paper on "The Use of Eserine in Veterinary Practice." In this able paper the doctor mastered the subject so thoroughly that little room was left for questions. The essayist received a vote of thanks.

Dr. W. G. Clark, of Marinette, Resident Secretary for Wisconsin of the American Veterinary Medical Association, gave an interesting talk urging more of their members to join that society, which seemed to have a good effect.

5 p. m. Moved to adjourn to the City Park, where an automobile ride about the city was enjoyed by all the members.

7 p. m. Nearly two hours were pleasantly spent at the banquet held at the New Erving Hotel, with Dr. H. A. Arpke, Toast Master.

9 p. m. The meeting called to order with President Forge in the chair.

Dr. T. F. Krey's able paper on "Veterinary Therapeutics" brought out much discussion by many members. The essayist received a vote of thanks.

Dr. D. B. Clark, State Veterinarian and member of the Wisconsin Live Stock Sanitary Board, gave the most complete report of the doings of that office ever published, showing that they were certainly abreast with the times. It showed that there were only seventeen cases of glanders in the state in the last year, three outbreaks of anthrax in the state in the last year, and that there were 48,181 cattle tested for tuberculosis, of which 2,171 reacted. The doctor showed that rabies was on the increase, and suggested that more stringent legislation be enacted in protection against this disease. He also stated that ten cases of Johne's disease had been reported to the Board during the last year.

Many interesting cases were reported by Drs. L. A. Wright, H. D. Pattison, H. F. Eckert, J. F. Roub, J. W. Tooley, T. H. Ferguson and others.

Dr. C. A. Deadman gave a very complete report of the cases operated upon at the last annual meeting, stating to the society the results of the same.

Regularly moved that the meeting adjourn to re-convene at Dr. J. W. Tooley's infirmary at 8 a. m. the following morning, July 20. Motion carried.

8 a. m., July 20. Members of the convention assembled at Dr. J. W. Tooley's hospital which is modernly equipped in every respect and afforded ample conveniences for the work on the abundance of clinical material which the doctor had selected. The clinical work included: Oophorectomy—Mare, 1; heifers, 15; bitches, 5. Cryptorchidectomy—Horses, 2. Lithotomy—Horse, 1. Molar Extraction—Horse, 1. Shoe Boil Ablation—Horse, 1. Peroneal Tenotomy—Horses, 2. Patellar Desmotomy—Horses, 2. Trimming Ears—Dogs, 3. Caponizing—Roosters, 4. Cases to Diagnose, 15. Post Mortem for Tuberculosis, 3.

A vote of thanks was extended to Dr. J. W. Tooley and the citizens of Fond du Lac for their efforts and interest shown in the convention.

At 4 p. m. an enjoyable excursion on Lake Winnebago was highly appreciated by all present.

Volunteers for the program to the annual meeting were: Dr. W. H. Dreher, H. A. Arpke, J. S. Atkinson, C. M. Crane, L. Tasche, J. C. Rhodes, A. M. Haushalter, H. E. Mooney, E. C. Eckert, C. E. Evans, L. A. Wright, P. J. Wilkinson, B. F. Kin-yon, W. F. Schweisow, R. A. Reinhard, F. A. Wilson and O. H. Eliason.

Moved and seconded to adjourn until the annual meeting at Madison, January, 1911.

J. P. WEST, *Secretary,*
Madison, Wis.

ALABAMA VETERINARY MEDICAL ASSOCIATION.

The Third Annual Meeting of the Alabama Veterinary Medical Association was held at Montgomery, Alabama, July 20 and 21, 1910.

The meeting was opened with an address by the president, I. S. McAdory. This was followed by a report of the secretary and treasurer.

Dr. W. D. Staples, of Anniston, Ala., read an interesting paper on periodic ophthalmia.

Dr. P. F. Bahnsen, State Veterinarian of Georgia, read a valuable paper on the treatment of tetanus in which he rather

severely criticized the quacks and some proprietary medicine companies for publishing quack testimonials concerning the successful treatment of tetanus with tetanus antitoxine. The doctor most assuredly stated that tetanus antitoxine is of no value as a cure for tetanus.

Dr. M. F. Jackson, of Birmingham, read a paper on the treatment of pneumonia which led to a free and interesting discussion.

Dr. O. R. Eatman, of Gadsden, next gave his views on the causes, symptoms and treatment of azoturia.

Dr. G. W. Browning, of Montgomery, contributed a paper on ergotism.

Dr. W. B. Fleming, of Montgomery, gave his experiences in treating stomatitis in dogs. His experience with diphtheria antitoxine as a remedy indicated that it was of no value in this disease. This subject of sore mouth or stomatitis in dogs, was quite freely discussed. Various opinions were given as to the cause and nature of the disease, some claiming that it was canine typhus, others that it was due to the *Bacillus necrophorus*, and others that it was a form of distemper. The consensus of opinion seemed to indicate that no specific treatment had yet been discovered and the real cause of the disease remains to be discovered.

Dr. B. T. Houston, of Mobile, then read a paper on punctured wounds of the foot. As usual, foot punctures being so common, led to an extended discussion by all the members of the association.

Dr. P. W. Hudson, of Mobile, sent in a paper on "Keratoma in the Ox," and it was read by the secretary.

Dr. R. J. Heyde sent in a paper on "Meat Inspection," and it was read by Doctor Staples.

Dr. I. S. McAdory then gave his experience with the bismuth, wax and vaseline paste mixture in the treatment of fistulous withers. This led to a lively and long discussion.

Dr. C. A. Cary, of Auburn, next gave a short talk on his method of surgical treatment for ventral hernia.

One notable thing concerning this meeting was that all the members who were on the program came forward with papers with the exception of two.

The association decided to appoint a committee to draw up a practice law to be presented to the next legislature. All the mem-

bers were very much interested in having a law passed in order to stop extensive quackery in the state.

The following officers were elected for the ensuing year: Dr. M. F. Jackson, Birmingham, president; Dr. W. B. Fleming, Montgomery, vice-president; Dr. C. A. Cary, Auburn, secretary and treasurer.

C. A. CARY, Secretary.

SCHUYLKILL VALLEY VETERINARY ASSOCIATION.

The Annual Meeting of the Schuylkill Valley Veterinary Association was called to order June 15, 1910, at 2 o'clock, p. m., by Dr. U. S. Bieber, Kutztown, who was elected president *pro tem.* upon a motion. Roll call proved the following members present: Drs. Huyett, Noack, Bieber, Fetherolf, Wehr and W. S. Longacre. The minutes of the previous session were read by the secretary, Dr. Huyett, and were approved.

Dr. Bieber called upon Dr. Noack to respond in place of the president's address, the president being absent. Dr. Noack referred to the membership of organizations and suggested methods to gain new members, explaining that every member should aim for new members.

There was a short recess for collection of dues.

Next in order was the reading of the secretary's report, correspondence, etc.

As delegate to the last session of the Pennsylvania Veterinary Association Dr. Noack gave a few remarks. He stated that Dr. Helmar, Scranton, was elected as president.

Dr. Bieber also reported.

The treasurer handed in an excellent report showing a nice balance in the treasury.

Report from the Legislative Committee: Progress was reported, promising a full report by the Fall Meeting.

Election of officers (under new business):

President—Dr. W. S. Longacre, Mantz, Pa.

Vice-President—Dr. G. R. Fetherolf, Reading, Pa.

Treasurer—Dr. U. S. Bieber, Kutztown, Pa.

Corresponding Secretary—Dr. W. G. Huyett, Wernersville, Pa.

Recording Secretary—Dr. M. D. Harper, Breinigsville, Pa.
Board of Trustees—Dr. E. D. Longacre, Shenandoah, Pa.; Dr. O. G. Noack, Reading, Pa.; Dr. W. S. Longacre, Mantz, Pa.

All officers were duly elected by acclamation.

Essays and papers—The Babcock Testing of Milk was fully and nicely illustrated by City Meat and Milk Inspector Dr. G. R. Fetherolf in his laboratory to the members.

Under some valuable case reports Dr. W. S. Longacre related his experience in treating five or six cases of intestinal pain in the horse. These cases were ably discussed.

Dr. Bieber promised to present a paper for the next meeting on "The Alkaloidal Treatment," as he was not fully prepared at this time to present same.

Dr. Fetherolf on "The Souring of Milk." This proved a very instructive paper, the speaker fully illustrating the various forms of bacteria producing the changes of milk. Discussion was conducted by Drs. Longacre, W. S. Huyett, Noack and Fetherolf.

Adjourned.

W. G. HUYETT, *Secretary.*

CONNECTICUT VETERINARY MEDICAL ASSOCIATION.

The Semi-annual Meeting of this association was held in New London, Thursday, August 4, 1910.

The members met at Dr. Underhill's hospital at 10 a. m.; from there they went for a sail up the Thames River to Gales Ferry and Red Top, returning about noon, when the late arrivals joined the party for a trolley ride to Ocean Beach where a shore dinner was served. After dinner the party enjoyed a sail about the harbor until 4.15 p. m., when the business meeting was called to order, at the Mohican Hotel, by the president, Dr. Bushnell.

Members present: Drs. Thos. Bland, F. F. Bushnell, H. C. Balzer, B. K. Dow, J. H. Kelley, R. P. Lyman, G. W. Loveland, G. H. Parkinson, J. E. Underhill, H. Whitney. Honorary member, H. O. Averill. Commissioner on Domestic Animals, Joseph M. Curry, and Oscar Schreck.

Minutes of the previous meeting read and approved.

It was voted to suspend the By-Laws for the present meeting regarding the admission of members and that the president appoint a member to fill the vacancy on the Board of Censors to allow the Board to report on applications for membership. The President appointed Dr. Kelley to fill the vacancy. The Board then reported favorably on the following applications:

George L. Cheney, V.S., New Haven; vouchers, Drs. H. Whitney and Lyman. Oscar Schreck, M.D.V., New Haven; vouchers, Drs. H. Whitney and R. P. Lyman. Joseph M. Curry, B.V.Sc., Hartford; vouchers, Drs. H. Whitney and R. P. Lyman.

It was voted to accept the report of the Board of Censors and admit to membership the above applicants.

Under the head of new business the matter of unpaid dues was brought up for consideration. It was voted to instruct the secretary to notify all members two years in arrears in their dues that if their dues were not paid within thirty days from receipt of notice, they would be dropped from membership for non-payment of dues.

Meeting adjourned at 5.30 p. m.

B. K. Dow, *Secretary.*

NORTH CAROLINA VETERINARY MEDICAL ASSOCIATION.

The above association held its annual meeting in Monroe, N. C., on June 23d, at which time six new members were added. The election of officers resulted as follows: President, Dr. Watt Ashcraft, Monroe, N. C.; Vice-President, Dr. F. S. Charter, Greensboro, N. C.; Secretary and Treasurer, Dr. W. G. Chrisman, Raleigh, N. C. This was by far the most interesting and successful meeting ever held by the Association.

VIRGINIA VETERINARY MEDICAL ASSOCIATION.

This association had its semi-annual session in Norfolk July 15th, at which time fifteen new members were added. This meeting was an especially good one, and the literary program was considerably above par. Our next meeting will be held in Richmond, Va., January 13th, 1911.

W. G. CHRISMAN, *Secretary.*

NEWS AND ITEMS.

UNDER date of June 16, Dr. Yard, of Denver, Col., sent the following case in which a dairy cow deliberately tried to commit suicide with its offspring.

On June 14 I was called by the State Dairy Commissioner to one of the most peculiar acts of a dumb beast which has ever come to my notice. The case was one of an eight-year-old dairy cow which had belonged to the State Dairy Commissioner since birth. This cow had always been one of his best milkers and the best-tempered animal in a bunch of fifty cows. The morning of the 14th the hired man had turned all the cattle out in a pasture which had in one end of it a large private lake which was used to water the stock and for irrigation.

About nine o'clock in the morning one of the attendants looked out at the bunch and in the distance, away from the rest of the grazing stock, he saw one cow up to her knees in the lake. Thinking this a very funny thing for the cow to do, as it was not warm, being so early in the morning, he went towards the lake to investigate and, upon reaching the edge of the water, saw that the cow had given birth to a fine heifer calf. The calf was taken up to the house and rubbed and dried and given to its mother to look after, but she would not notice the calf—in fact, walked away from it. The cow was then driven into another pasture which was well fenced. Nothing was thought of the matter until about two hours later when one of the women folks happened to look out of the door and saw a cow standing in the lake about the same position as the first one. She called to one of the men to go and see what was the cause of *another* cow standing in the same location and it was found that the *same* cow had broken down the fence of the pasture and was in the lake at the same spot and had given birth to a *second* calf; but calf number two was dead by the time the man arrived.

Both calves were heifers and the first one is at the present time doing fine; still the mother will take no notice of it. Thinking this a very remarkable thing, although it does not teach us anything medically, it shows that there are even animals that are ashamed of what they have done and try to get rid of it.

VETERINARY MEDICAL ASSOCIATION MEETINGS.

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list :

Name of Organization.	Date of Next Meeting.	Place of Meeting.	Name and Address Secretary
Alumni Ass'n, N. Y.-A. V. C.....	Sept. 6, 7, 8, 9, 10	141 W. 54th St. San Francisco.	J. F. Carey, East Orange, N.J. R. P. Lyman, Kansas City, Mo Horace E. Rice, Little Rock
American V. M. Ass'n.....	1st and 3d Thur. of each month	Lec. Room, La- val Un'y, Mon.	J. P. A. Houde, Montreal.
Arkansas Veterinary Ass'n.....	2d Fri. ea. mo...	Chicago.....	H. A. Smith, Chicago, Ill.
Ass'n Médécale Veterinaire Fran- çaise "Laval".....	.....	San Francisco.	J. J. Hogarty, Oakland.
B. A. I. Vet. In. A., Chicago.....	.....	Ottawa.....	A. E. James, Ottawa.
California State V. M. Ass'n.....	.....	Chicago.....	J. M. Parks, Chicago.
Central Canada V. Ass'n.....	.....	Denver.....	M. J. Woodliffe, Denver.
Chicago Veterinary Society.....	.....	Hartford.....	B. K. Dow, Willimantic.
Colorado State V. M. Ass'n.....	.....	Atlanta.....	J. H. Taylor, Henrietta.
Connecticut V. M. Ass'n.....	.....	.....	P. F. Bahnsen, Americus.
Genesee Valley V. M. Ass'n.....	1st Tues. Feb. '11	.....	Louis P. Cook, Cincinnati.
Georgia State V. M. A.....	Dec. 21, 22, 1910.	.....	J. H. Crawford, Harvard.
Hamilton Co. (Ohio) V. A.....	.....	.....	F. Hockman, Louisville.
Illinois State V. M. Ass'n.....	Aug. 2, 3, 4, 1910	Anna.....	E. M. Bronson, Indianapolis.
Illinois V. M. and Surg. A.....	Jan. 11, 12, 1911.	Indianapolis.....	H. C. Simpson, Denison.
Indiana Veterinary Association.....	.....	.....	B. Rogers, Manhattan.
Iowa Veterinary Ass'n.....	Jan. 10, 11, 1911.	Topeka.....	D. A. Piatt, Lexington.
Kansas State V. M. Ass'n.....	.....	Not decided.....	S. Lockett, Glenolden.
Kentucky V. M. Ass'n.....	Sept. 13, 1910.	Philadelphia.....	E. P. Flower, Baton Rouge.
Louisiana State V. M. Ass'n.....	.....	.....	C. L. Blakely, Augusta.
Maine Vet. Med. Ass'n.....	.....	Baltimore.....	H. H. Counselman, Sec'y.
Maryland State Vet. Society.....	Monthly.....	Boston.....	Wm. T. White, Newtonville.
Massachusetts Vet. Ass'n.....	.....	.....	Judson Black, Richmond.
Michigan State V. M. Ass'n.....	.....	.....	G. Ed. Leech, Winona.
Minnesota State V. M. Ass'n.....	.....	Kansas City.....	J. C. Robert, Agricultural Col.
Mississippi State V. M. Ass'n.....	.....	.....	Hal. C. Simpson, Denison, Ia.
Missouri Valley V. Ass'n.....	.....	.....	D. L. Luckey,
Missouri Vet. Med. Ass'n.....	.....	.....	W. S. Swank, Miles City.
Montana State V. M. A.....	.....	Helena.....	H. Jensen, Weeping Water.
Nebraska V. M. Ass'n.....	.....	Grand Island.....	J. F. De Vine, Goshen.
New York S. V. M. Soc'y.....	Aug. 25, 26, 27, 1910	Ithaca.....	W. G. Chrisman, Raleigh.
North Carolina V. M. Ass'n.....	.....	Fargo.....	C. H. Martin, Valley City.
North Dakota V. M. Ass'n.....	.....	.....	.....
North-Western Ohio V. M. A.....	.....	Lima.....	A. J. Kline, Wauseon.
Ohio State V. M. Ass'n.....	.....	Up'r Sandusky.....	O. V. Brumley, Columbus.
Ohio Soc. of Comparative Med.....	Annually .....	.....	F. F. Sheets, Van Wert, Ohio.
Oklahoma V. M. Ass'n.....	1st week in Aug.	Paterson, N. J.....	R. A. Phillips, Oklahoma City.
Ontario Vet. Ass'n.....	Call of Chair.	Harrisburg.....	C. H. Sweetapple, Toronto.
Passaic Co. V. M. Ass'n.....	Sept. 20, 1910.	.....	H. K. Berry, Paterson, N. J.
Pennsylvania State V. M. A.....	.....	Portland, Ore.....	F. H. Schneider.
Philippine V. M. A.....	4th Tues. ea. mo.	Mon. and Que.....	Chas. G. Thomson, Manila.
Portland Vet. Med. Ass'n.....	.....	Providence	Peter Hanson, Portland, Ore.
Province of Quebec V. M. A.....	Jan. and June.	.....	Gustave Boyer, Rigaud, P. Q.
Rhode Island V. M. Ass'n.....	1st Wed. fol. the	St. Louis.....	J. S. Pollard, Providence
St. Louis Soc. of Vet. Inspectors.	2d Sun. ea. mo.	Reading.....	Wm. T. Conway, St. Louis, Mo
.....	Dec. 21, 1910...	Philadelphia.....	W. G. Huyett, Wernersville.
Schuylkill Valley V. M. A.....	.....	.....	B. T. Woodward, Wash'n, D.C.
Soc. Vet. Alumni Univ. Penn.....	.....	.....	J. A. Graham, Sioux Falls.
South Dakota V. M. A.....	.....	Los Angeles.....	.....
Southern Auxiliary of California	Jan. Apl. Jy. Oct.	407 Ill. Ave.....	A. D. Hubbell, Los Angeles.
State V. M. Ass'n.....	4th Tues. ea. mo.	.....	H. R. Collins, So. St. Joseph
So. St. Joseph Ass'n of Vet. Insp.	.....	.....	A. C. Topmiller, Murfreesboro
Tennessee Vet. Med. Ass'n.....	.....	St. P. Minneap.....	R. P. Marsteller, College Sta.
Texas V. M. Ass'n.....	Call Exec. Com.	.....	S. H. Ward, St. Paul, Minn.
Twin City V. M. Ass'n.....	2d Thu. ea. mo.	.....	G. T. Stevenson, Burlington.
Vermont Vet. Med. Ass'n.....	.....	.....	C. H. H. Sweetapple, For.
Veterinary Ass'n of Alberta.....	.....	.....	Saskatchewan, Alta., Can.
Vet. Ass'n Dist. of Columbia.....	3d Wed. ea. mo.	514—9th St., N. W.....	.....
Vet. Ass'n of Manitoba.....	Not stated.....	Winnipeg.....	M. Page Smith, Wash., D.C.
Vet. Med. Ass'n of N. J.	.....	.....	F. Torrance, Winnipeg.
V. M. Ass'n, New York City.....	1st Wed. ea. mo.	141 W. 54th St.	W. Herbert Lowe, Paterson.
Veterinary Practitioners' Club.....	Monthly.....	Jersey City	W. Reid Blair, N. Y. City.
Virginia State V. M. Ass'n.....	Jan. 13, 1911.	Richmond.....	A. F. Mount, Jersey City.
Washington State Col. V. M. A.....	1st & 3d Fri. Eve.	Pullman.....	W. G. Chrisman, Raleigh.
Washington State V. M. A.....	.....	Seattle.....	R. G. McAlister, Pullman.
Western Penn. V. M. Ass'n.....	1st Wed. ea. mo.	Pittsburgh.....	J. T. Seely, Seattle.
Wisconsin Soc. Vet. Grad.....	Jan. 1911.	Madison.....	F. Weitzell, Allegheny.
York Co. (Pa.) V. M. A.....	Sept 6, 1910.	York.....	J. P. West, Madison.
			E. S. Bausticker, York, Pa.

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